FEBRUARY 1956

INDUSTRY & WELDING

The 37½° Bevel for Pipeline Welding

STEVENS RICE
UNIVERSITY MICROFILMS
313 N 1ST ST
ANN ARBOR MICH
WIR

An authority on pipeline welding tells why his company chose the 37½° bevel . . . starts on page 46

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How to Position Your Automatic Welding 54

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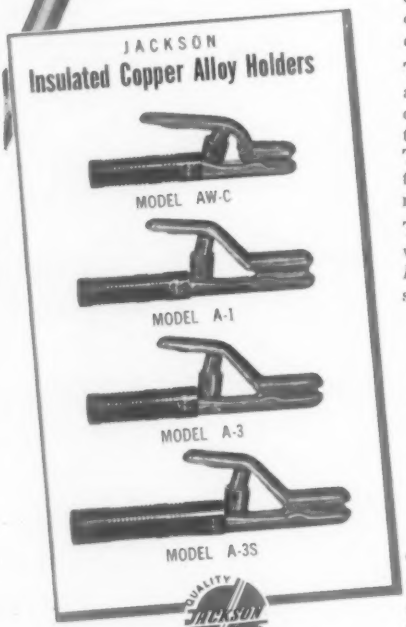
How CO_2 Welding Speeds Production 80

Duty-Cycle Rated for Top Production



In today's competitive race for stepped-up production, we see new welding machines and new electrodes coming on the market, all designed to do the work easier and faster.

Therefore, in choosing the right electrode holder for a job, don't think of *rod size* alone. We must equally consider *amperage* and *cable size*, and today, more than ever, the required *number of electrodes per hour*. These four factors combined establish the *duty cycle*, that is the percentage of actual arc-time in any ten-minute period of work.

The following table shows the duty cycles possible with the various *Jackson Insulated Copper Alloy Holders*, based on using the electrodes and cable sizes as indicated.

Holder Class	Model Number	Electrode Size	Amperage	Cable Size	Duty Cycle
SMALL	AW-C	7/32"	250 300	1 1/0	50%
MEDIUM	A-1	1/4"	300 350	1/0 2/0	50%
LARGE	A-3	3/8"	375 450	2/0 3/0	65%
HEAVY-DUTY	A-3S	3/8"	500	4/0	80%

This table will help you in making the right selection from these Jackson copper alloy holders. Using a superior 98% copper alloy heat treated for greater strength, hardness and conductivity, these holders permit highest duty cycles with ample margin of safety.

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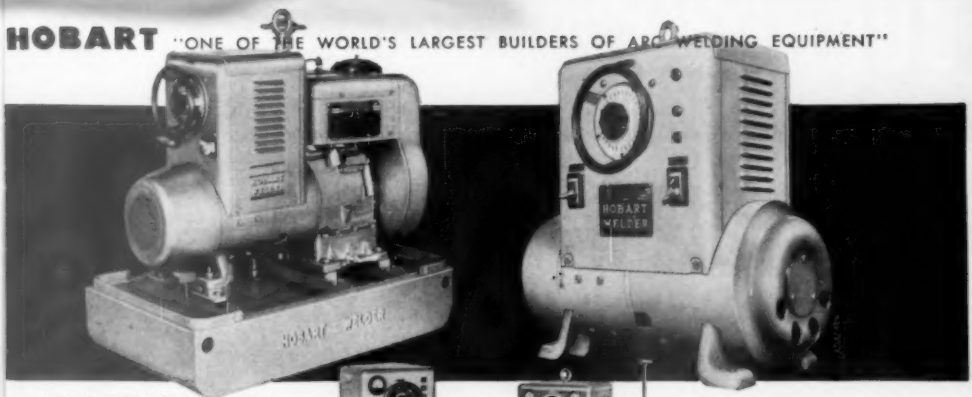
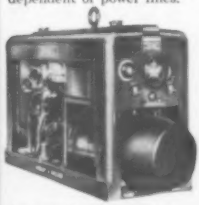
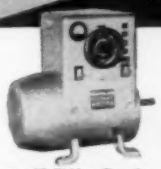


"Husky Boy." This low investment, lightweight 200 amp. air-cooled model is perfect for general shop and outside repair work. Easily mounts on truck or trailer. Portable mountings available.

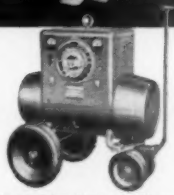
Air-cooled AC Power—AC Welder. It's a 2-in-1 unit. It welds anywhere or supplies power for operating tools, lights, pumps, paint sprays, etc., independent of power lines.



Contractor Special. A 250 amp. gas drive model that has plenty of engine power and a hot, fast, dependable arc.



AC Power—AC Welder. Couple this model directly to your gas engine by means of a V-belt or pulley and you can weld or have emergency power when and where you need it on a moment's notice.



Electric Drive. 300 and 400 amp. welders. Ideal for production, maintenance and repair service. Conservative rating lets you do heavy duty welding for limited periods of time.

"Bantam Champ." 250 amp. welder especially designed for light to medium requirements. Popular for all fabrication purposes in the 200 to 250 amp. class.

Transformer Welders. 180 to 500 amp. models for shops that have only single phase power. Exceptional high efficiency and low cost maintenance.

DC Rectifier. 300 amp. Has three delta connected transformer . . . magnetic line switch . . . overload protection, plus remote control.

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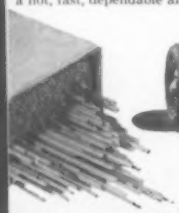

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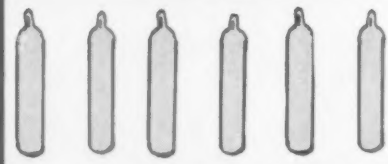

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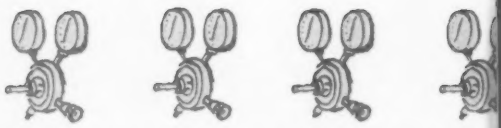
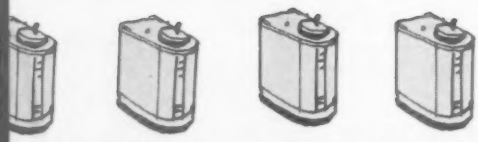
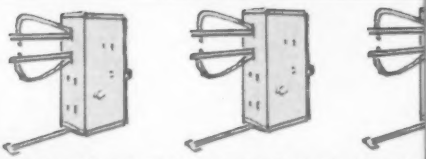


GAS WELDING EQUIPMENT

equipment to do the job



ARC WELDING EQUIPMENT



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Industry & Welding

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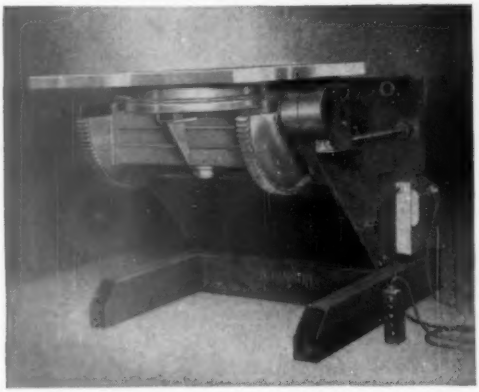

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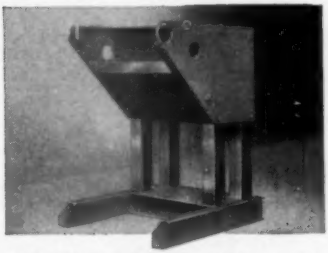

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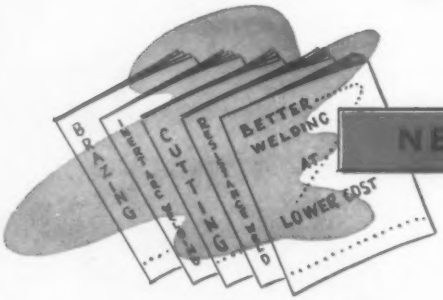


NEW REFERENCE DATA

The publications featured on these pages were written by experts. They are FREE to our readers. To obtain these helpful reference materials use postcard bound into this issue.

ALUMINUM WELDING, BRAZING AND SOLDERING MATERIALS are covered in a chart compiled by the Aluminum Company of America. Filler alloys, brazing wire, brazing sheet, and flux designations, operating ranges, and general uses are included. **Circle No. 105 on Reader Service Card.**

PRODUCTION WELDING EQUIPMENT, such as special application welding fixtures, positioners, turning rolls, seamers, are shown in a new 28-page manual offered by Pandjiris Weldment Co. Manual contains application photographs, descriptions of equipment used in steel fabricating industries — construction, railroads, tank, pipe, automotive, ordinance, shipbuilding, farm equipment and many others. **Circle No. 106 on Reader Service Card.**

PORTABLE ELECTRIC TOOLS, ATTACHMENTS, AND ACCESSORIES manufactured by Black & Decker Mfg. Company, are featured in their latest price list. Individual and quantity prices are given. **Circle No. 107 on Service Card.**

COVER PLATES AND COVER LENSES individually bought, are a trifling expense, but over a period of time the cost mounts up. American Industrial Safety Equipment Co., has brought out several brochures which are said to show the utility of their cover plates and cover lenses. Both brochures cite specific information obtained from on-the-job and laboratory tests and both include comparative cost data. **Circle No. 108 on Reader Service Card.**

MILD STEEL ELECTRODES are featured in the latest Catalog B-6078, prepared by the technical staff of the Welding Department, Westinghouse Electric Corp. Features code requirements, applications and procedures which are given thorough treatment. **Circle No. 109 on Reader Service Card.**

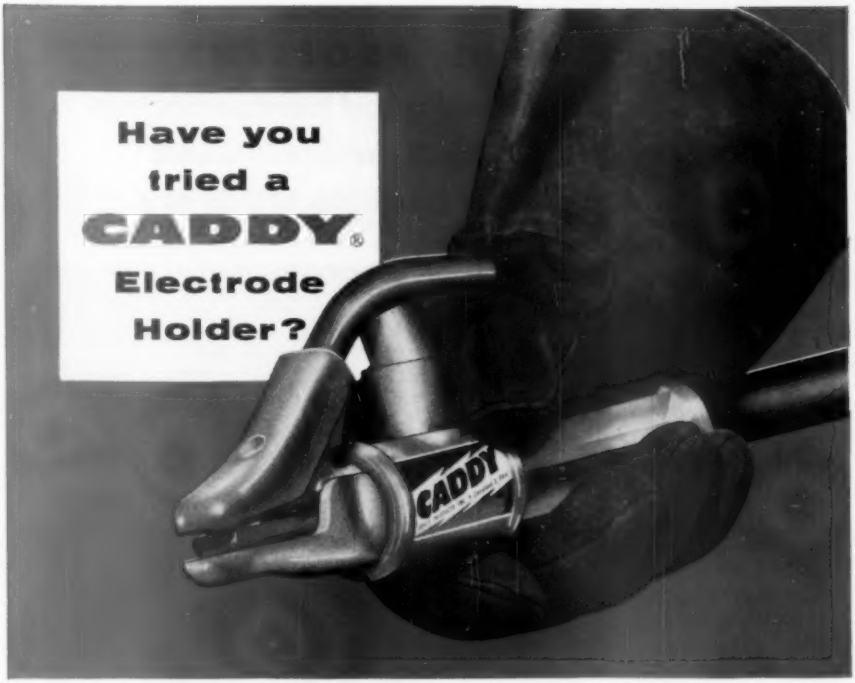
200-AMP ENGINE DRIVEN WELDER is introduced by General Electric Co. in Bulletin GEC-1333. Among features discussed are smooth, slow-running Hercules engine, NEMA rated; superior arc characteristics and slowdown control which saves on gas, oil and reduces wear. **Circle No. 39 on Reader Service Card.**

ARTICLE PREPRINT ON CO_2 CONSUMABLE-ELECTRODE WELDING, may be obtained from Air Reduction Sales Company. Author is G. R. Rothschild of Air Reduction's Research Laboratories. Article deals with operating characteristics and specific applications. **Circle No. 110 on Reader Service Card.**

TOGGLE ACTION CLAMPING DEVICES are the topic of a useful 72-page bound catalog published by Lapeer Manufacturing Co. Hand and air operated clamps are shown by means of scale drawings and photographs. Manufacturer shows how standard clamps can be altered for special applications. **Circle No. 111 on Reader Service Card.**

COMPLETE LINE OF WELDING ACCESSORIES is featured in the indexed Catalog EW-191, prepared by Hobart Brothers Co. Includes helmets, holders, cable, clamps, in fact, everything from anti-spatter compound and protective clothing to books on welding. **Circle No. 112 on Reader Service Card.**

Turn to Page 13 For More Useful Literature.



You should–and here's the reason why: 9 out of every 10 companies that tested CADDY Electrode holders in 1955 switched to CADDY as their standard unit.

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COAST METALS (CANADA), LTD.

Hamilton **Ontario**

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PRECISION DRAWN FABRICATED WIRE for automatic and semi-automatic hard-facing applications is described in Drawalloy Corporation's newest brochure. Applications are shown and various features explained. **Circle No. 32.**

COMPLETE NEW LINE OF AC WELDERS is introduced by General Electric Co. in Bulletin GEA-6243. Special features of line, including no false starts, easy-to-handle arc and finger-tip control, are described in detail. Machines are rated at 300, 400 and 500 amps . . . 295 amps for general-purpose welding. **Circle No. 38 on Reader Service Card.**

PRESS BRAKES FUNDAMENTALS AND APPLICATIONS are the subject of a useful 72-page loose-leaf book prepared by a panel of experts at The Cincinnati Shaper Company. Filled with useful data, tables, drawings, it describes company's line of metal working products. **Circle No. 113 on Service Card.**

NEW ALUMINUM AND ALUMINUM ALLOY ELECTRODE is the subject of a brochure produced by Eutectic Welding Alloys Corp. Brochure describes the arc welding of aluminum and gives Physical properties of the new electrodes production experiences with the new electrode is cited. **Circle No. 114 on Reader Service Card.**

COMPRESSED AIR BLOW GUNS, SPEED COUPLERS AND CONNECTORS, built by Aro Equipment Corp., are featured in Catalog 5545-T. Contains data on their application in production work and in inspection. Description of various series is given. **Circle No. 115 on Reader Service Card.**

OPTICAL PRODUCTS made of hard surface plastic are described in a folder prepared by Pioneer Scientific Corporation. Package contains bulletins describing cover plates and lenses, clear and green safety lenses, and a wide selection of safety glasses. **Circle No. 116.**

WELDING ACCESSORIES, SUCH AS FLINT LIGHTERS, SINGLE AND DUAL HOSE, cylinder trucks, pressure gauges, welding helmets—all products of the Burdett Oxygen Company—are cataloged in a new and colorful brochure. **Circle No. 18 on Reader Service Card.**

BENCH-MOUNTED PRECISION RESISTANCE WELDER, used for joining small metal assemblies is described in a new bulletin prepared by Unitek Corporation. The colorful brochure explains the scope of this automatic spot welder and shows many of the small metal products which it is said to join with ease. **Circle No. 117 on Reader Service Card.**

USE THE READER SERVICE CARD FOR VALUABLE REFERENCE DATA

LIGHTWEIGHT VERSATILE AC WELDING MACHINE is described in Bulletin SB-1357, prepared by The Lincoln Electric Co. The 100-amp machine may be used for welding, cutting, soldering, brazing or heating. **Circle No. 118.**

USEFUL HARD-FACING ALLOYS COMPARISON CHART, has been made available by Alloy Rods Company. Suitable for hanging on a wall, it also can be folded and placed in a shop note book. Hard-facing products of 29 companies are listed. **Circle No. 119 on Service Card.**

WHAT YOU CAN DO WITH SUBMERGED MELT WELDING is a reprint of an article written by a Linde Air Products Co. staff member. Gives a comprehensive picture of fundamentals, welding joint design and applications. **Circle No. 120 on Reader Service Card.**

LOW TEMPERATURE SILVER ALLOY BRAZING is covered in a manual published by Handy & Harman. Manual describes the melting range of alloys, brazing range, types of metals joined, strength and ductility, corrosion resistance, fundamentals of brazing, etc. **Circle No. 43 on Reader Service Card.**

Turn the Page For More Free Reference Data

HERE'S A PITCH ON LOW HYDROGEN ELECTRODES, showing how "difficult" steels can be welded easily with little or no preheat. The bulletin is R-26-2 prepared by Harnischfeger Corporation. Data is effectively presented. **Circle No. 44 on Reader Service Card.**

FOR PIPE THAWING FROZEN WATER PIPES, and said to operate electronically, the latest pipe thawer manufactured by Trindl Products Ltd., is described in a new bulletin. Utility of equipment is pointed out. Operation is explained and cost data is included. **Circle No. 122.**

WRENCHLESS-TYPE IRON BENDER, suitable for bending rounds, pipe, flats, squares, conduit and angle iron, are described in loose-leaf bulletin No. 11612, of the Hossfeld Manufacturing Co. Illustrations show wide range of applications. **Circle No. 123 on Reader Service Card.**

METAL CUTTING BAND SAWS are described in catalog G-55, available from Wells Manufacturing Corp. The complete line of Wells band saws are included. Catalog also contains a Handy blade and speed selection chart for cutting various materials. **Circle No. 124.**

WELDING MACHINE SPECIFICATIONS are presented in a concise, useful, brochure prepared by A. O. Smith Corporation's Welding Products Division. Complete line of welding machines is included. Electrical data is thoroughly presented. **Circle No. 125 on Reader Service Card.**

HARDSURFACING RODS AND COILS are shown in the latest literature prepared by Coast Metals, Inc. Literature contains welding specifications, characteristics of the deposit and applications. **Circle No. 28 on Reader Service Card.**

Turn To Page 16

NOTCH THESE ENDS WITH ONE STROKE OF PUNCH PRESS

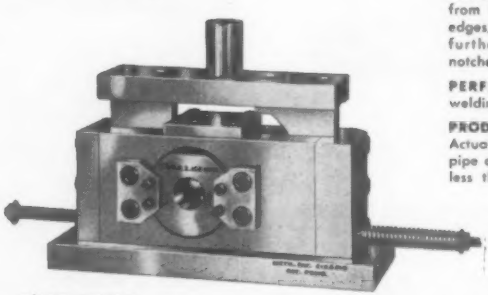
ARC-TWIN Notch

NO DEFORMATION Shears from inside out—cuts clean edges; eliminates need for further finishing; aligns notches automatically.

PERFECT "T" Joints for welding or brazing.

PRODUCTION NOTCHING Actual production time per pipe or tube end reduced to less than 3 seconds.

INTERCHANGEABLE Punches and dies up to 2⅜" O.D. pipe or tube for ARC-TWIN NOTCH. (Special units available up to 3" O.D.)



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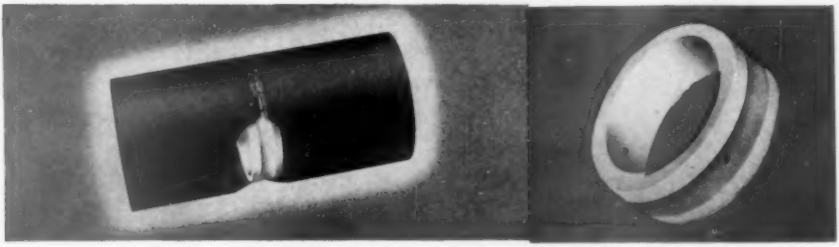
Better pipewelds

with new **CERAMIC**

BACKING RINGS

IMPROVE WELD QUALITY
SPEED WELDING PRODUCTION
REQUIRE LESS SKILL
EASILY REMOVED WHEN WELD IS COMPLETED
ADAPTABLE FOR FIELD OR SHOP ERECTION
WITHSTAND ROUGH HANDLING



PYROTONE Ceramic Backing Rings, "heat engineered" to withstand high arc temperatures, insure proper root fusion. They reduce "test failures," speed welding operations, lower the cost of fabrication, and are completely and easily removable from pipe.

CALL OR WRITE FOR ADDITIONAL INFORMATION

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General Offices and Plant: KEASBEY, NEW JERSEY

Circle No. 37 on Reader Service Card.

Free Reference Data

from page 14

POCKET SIZE BRAZING MANUAL compiled by All-State Welding Alloys Co., Inc., is now available. Contains data for brazing shapes, sheet, castings, tubing and assemblies of copper, brass, steel, aluminum and cast iron. **Circle No. 126.**

GLOVES FOR WELDING OPERATORS are displayed in an interesting four color brochure published by the Advance Glove Mfg. Company. Among the features emphasized are comfort and safety. Many models shown, having a variety of applications, are made out of leather and plastic materials. **Circle No. 127 on Reader Service Card.**

PRECISION WELDING OF TANKS using a horn jig is described in Cayuga Machine & Fabricating Co., Inc. Bulletin No. 5304. Detail drawings and photographs are shown. Dimensions and other data are also given. **Circle No. 128.**

BASIC GUIDE TO FERROUS METALLURGY is the name of a chart prepared by Tempil Corporation. This handy reference source lists the characteristics of steels across the temperature range to 2900°F. The important working zones are shown. Common metallurgical terms are defined. **Circle No. 129 on Reader Service Card.**

DRY ELECTRODES MEAN BETTER WELDS, MORE PROFIT, says Phoenix Products Company, in a colorful and interesting brochure. Electrode drying ovens ranging in storage capacity from 10 to 1,100 lbs. are described and illustrated. **Circle No. 73 on Reader Service Card.**

FILMS PROMOTE WELDING. A series of five 16-mm sound motion pictures are available from the Lincoln Electric Co. Movies—four of them in color— show many recent developments in arc welding and are offered to dealers and distributors for showing to any interested groups. **Circle No. 130 on Reader Service Card.**

Turn To Page 18

THE *Finest* in LIFTING . . . and POSITIONING CLAMPS

The gripping cam is actuated by pull on the lifting shackle. This increases gripping power as load becomes greater. Manual operation of locking lever causes clamp to snap lock on plate or assembly and snap open for easy removal.

Safety Snap Lock CLAMPS

- The only clamps with a safety lock
- Maximum speed and safety
- Lock on in any position
- Lock off in any position
- Cannot be accidentally knocked off

Free: Illustrated 14 page catalog.

- Replaces welded pad eyes and screw clamps
- Exceptionally light in weight
- Safe y factor 5 to 1
- From 1 ton to 20 ton sizes
- The toughest clamp ever built
- Made of finest grade tool steel

Attractive territories available to qualified distributors, dealers and representatives. Write for details.

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Circle No. 78 on Reader Service Card.

GB Silver Brazing Alloys

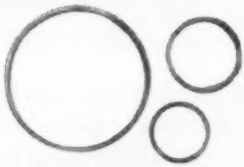
Used in Many Hospitals Where Safety Means Life or Death

Sound, leak-proof joints are a MUST in hospital construction requiring the piping of Oxygen and Anesthetic Gases to wards, rooms and nurseries for *instant use!* That's why leading designers and contractors specify dependable GB Silver Brazing Alloys, Preformed Rings and Fluxes.

GB Preformed Rings, for example, assure stronger, safer everlasting joints. They save time, require less metal, meet all specifications, cost less. Perhaps life or death are not a factor when you do silver brazing, but the dependability, efficiency and economy provided in GB products are good reasons for their choice . . . especially when they cost so little.

. . . Shown above is typical installation of oxygen wall outlet, snap coupler and flow meter. GB Preformed Rings are used to braze (1) wall assembly to screen; (2) tube to regulator; and (3) tube to gauge. For complete data write today.

GB FLUXES are fully active, deep penetrating, stable and economical. Produced under strict laboratory control they are extremely effective in producing high quality joints.



GB PREFORMED SILVER BRAZING RINGS are available in a wide range of sizes for all requirements. They are easy to use, save time and labor, assure lasting results.

GB SILVER BRAZING ALLOYS are made in random coils, strips and many special shapes in addition to preformed rings. Also available is Goldsmith's Technical Service Division cooperation for competent assistance in all brazing problems.

Dealer Distributor Inquiries Invited **Write for GB Data Book**

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Circle No. 41 on Reader Service Card.

GAMMA-RAY RADIOGRAPHY WITH RADIOACTIVE COBALT is covered in a technical booklet, No. N-4, released by Mitchell Radiation Products Corp. Includes data on application, cost and manipulation. **Circle No. 131 on Card.**

AMPCO WELDING NEWS, FOURTH QUARTER ISSUE released by Ampco Metal, Inc., describes repair of large crankshaft twisting machine, overlay of tube forming rolls with special filler rod and welding of grey iron to steel. **Circle No. 132 on Reader Service Card.**

RESISTANCE WELDING NEWS, ISSUE NO. 5510 is hot off the press at Taylor-Winfield Corp. Illustrated articles describe several practical, cost saving advantages which manufacturers have realized by using resistance welding machines. **Circle No. 133 on Reader Service Card.**

NEW DEVELOPMENT IN WELDING GLOVES, said to make really hot welding and burning jobs comfortably cool, is announced by Olympic Glove Company, Inc. Described in detail is novel heat-reflecting aluminum interlining. **Circle No. 121 on Reader Service Card.**

LOOKING FOR AUTOMATION IDEAS? Send for Expert Welding Machine Company's illustrated, 54-page loose-leaf book showing actual case histories of completely automatic submerged arc welding machines, inert arc machines, and multiple spot and seam welders. **Circle No. 134 on Reader Service Card.**

REINFORCED RESINOID PRODUCTS FOR WELD GRINDING, including grinding wheels, mounted wheels, and points, are featured in Catalog 1748 offered by Norton Company. Complete line of wheels is described and illustrated. Operating specifications are given and applications outlined. **Circle No. 70.**

Alloys and Fluxes for
SOLDERING
FILLING
SEALING
ARC WELDING
TORCH WELDING
FURNACE BRAZING
TORCH BRAZING
HOW TO use and apply alloys and fluxes for Soldering, Brazing and Welding Aluminum and Aluminum Alloys.
WORLD'S ONE AND ONLY COMPLETE LINE
of joining and sealing Alloys and Fluxes for
ALUMINUM
Handiest Pocket Reference is designed
Particularly to service operator needs
Brief • Direct • Available on request
This small folder is for the man at the torch or welding machine . . . will help him recognize the alloy made especially for the job he has at hand . . . will refresh his knowledge of exactly how to use it. FREE! Single copies or sufficient numbers to supply weldor crews.
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ALL-STATE WELDING ALLOYS CO., INC., WHITE PLAINS, N. Y.

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This 90° bend test proves

NEW Mang-Arc

Nickel-Manganese Electrodes

build tough welds!

Test specimen is ½" manganese plate with v-butt welded joint. Bare ⅜" Mang-Arc Nickel-Manganese Electrodes were used for the butt weld. Specimen was then machined by grinding and put in the testing machine. A full 90° bend was made before cracks appeared on the surface of the welded joint.

NEW Mang-Arc electrodes are made of fabricated *precision drawn wire* by new manufacturing techniques that give you the important advantage of excellent weldability and extra tough welds at lower cost!

Mang-Arc electrodes are available bare or coated. Find out how this new Alloy Rods development can save you money. Write for illustrated bulletin on new Mang-Arc Nickel-Manganese Electrodes today.

Alloy Rods Co.

General Offices and Plant
York 1, Pennsylvania
Pacific Coast Sales Offices and Plant
El Segundo, California

no finer electrodes made . . . anywhere

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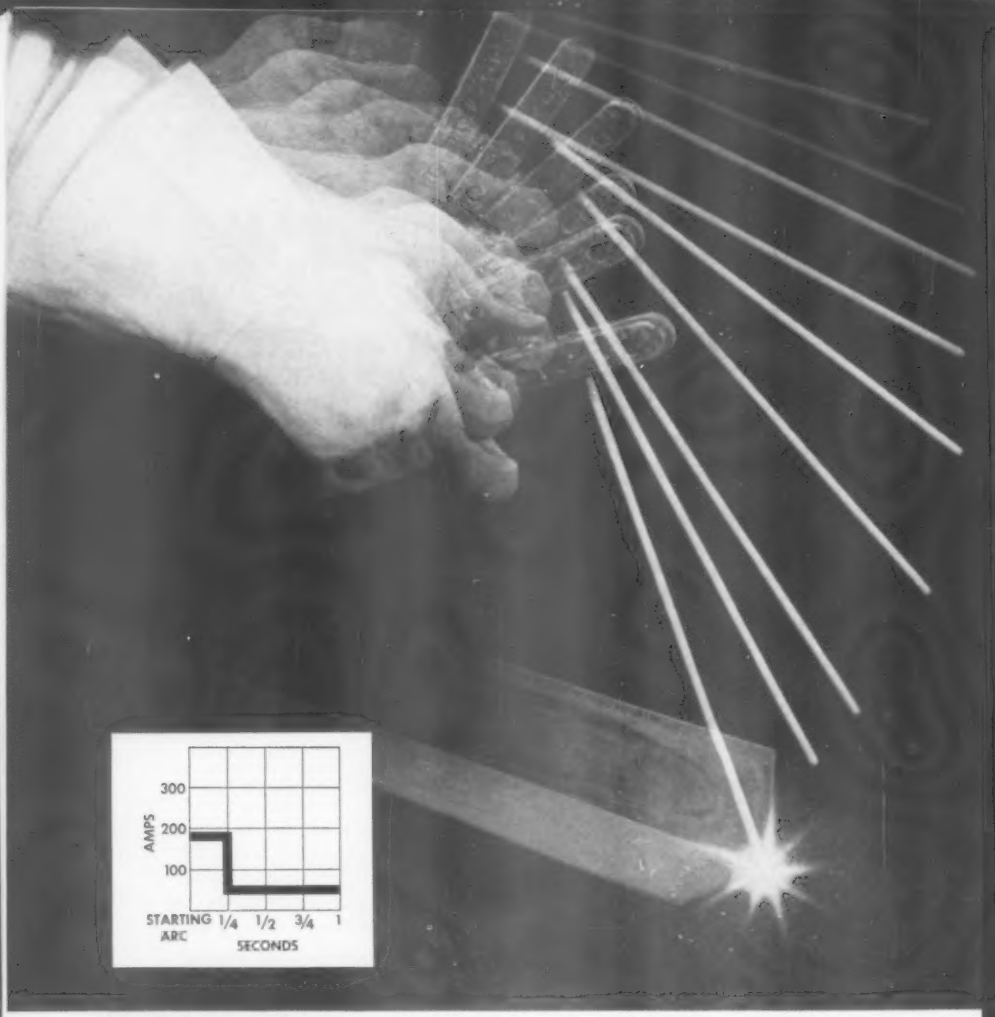
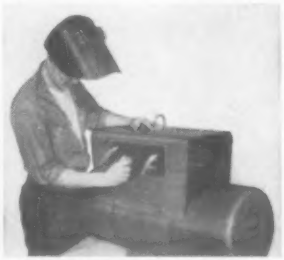


INSTANT ARC STRIKING is assured with the new General Electric a-c welder's automatic hot-start. Hot-start gives extra boost of current for ¼ second, eliminates false starting.

FOR ALL YOUR WELDING NEEDS . . .

A FULL LINE OF G.E. WELDERS AND ELECTRODES

G.E. offers all popular arc welders, electrodes, and accessories. This means that G.E. can give impartial recommendations on your welding needs.



G-E MOTOR-GENERATOR welders, in 200- and 300-amp sets, feature a unique interactor to eliminate popouts.

NEW G-E DC RECTIFIER welders (300 and 400 amps) feature G-E full-time arc-force control.

Circle No. 38 on Reader Service Card.

No False Starts . . . No "Popouts" With New G-E Line of AC Welders

Arc strikes instantly, stays steady—gives a sound weld from start to finish

Any professional weldor knows that better welds and easier welding begin with a good arc.

General Electric's new line of a-c transformer welders gives you this good arc—instant striking and steady—plus many other features that make your welding faster, easier, and more economical.

1. NO FALSE STARTS. G-E automatic hot start provides that necessary extra surge of current which assures you of instantaneous arc striking and extra penetration at the start of the weld.

2. ARCS ARE EASIER TO HANDLE, too. Popouts are practically eliminated because G.E. has made the normally stable a-c arc even more stable by the addition of special capacitors—which provide the equivalent of 5 additional open-circuit volts.

3. G.E.'s FINGER-TIP CONTROL design gives you pinpoint accuracy of current with the moving-coil design. You don't have to "crank" the handle on a G-E welder to change current settings. It smoothly moves the primary coil on a finely threaded, rubber-cushioned shaft to give you stepless current control.

SEE FOR YOURSELF the operating advantages of the G-E a-c welder line. Ratings are available in 300, 400, and 500 amps . . . and 295 amps for general-purpose welding. Contact your G-E Welding Distributor for a demonstration. He's listed in the yellow pages of your phone book.

GENERAL ELECTRIC

NEW 200-AMP engine-drive welder gives steady output, even when operated above full load.

G-E BALANCED DESIGN electrodes give you a combination of: ease of handling; X-ray quality; welding speed.

Circle No. 38 on Reader Service Card.

Section 711-3E
General Electric Co.,
Schenectady 5, N. Y.

Please send me the bulletins checked below:

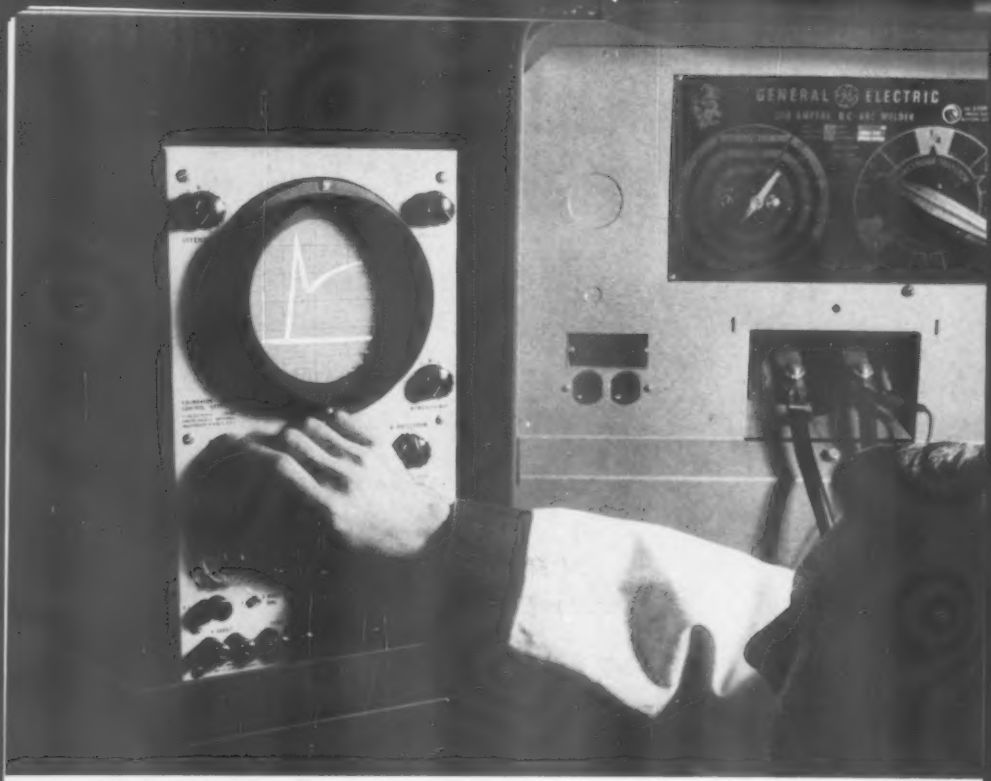
- ☐ GEA-6243 G-E AC Welders
- ☐ GEA-6242 G-E Rectifier Welders
- ☐ GEC-664 G-E MG Welders
- ☐ GEC-1333 G-E Engine-drive Welder
- ☐ GED-2584 G-E Electrode Catalog

Name .....

Title ..... Co. .....

Street .....

City ..... State .....



G.E.'s NEW ENGINE-DRIVE WELDER GIVES YOU . . .

Steady Welding Output—at Full Load; Improves Weld Quality, Costs Less Too

If you're using more than a 200-amp engine-drive welder for light to medium-heavy construction, you may be losing money.

G.E.'s new 200-amp engine-drive welder makes it unnecessary to buy expensive, higher-rated machines to compensate for loss of amperage at full load. This field-tested welder gives you steady output and 100% arc stability, hour-after-hour, even when operated *above* full load.

Test this powerful new welder and see the many other advanced design features—including new slow-down control, and electrode selector and current dial.

Contact your nearby G-E Welding Distributor. He's listed in the yellow pages of your phone book. Section 714-3E, General Electric Co., Schenectady 5, N. Y.

5 NICKELS stand on edge while welder is operated at full load, proving sturdiness.

GENERAL ELECTRIC

One of the several reasons why it is such an effortless pleasure to adjust a National regulator tension screw to any desired delivery pressure setting is the nylon bearing. Of course, another important reason is the fully sealed tension screw bearing section which permits neither dust nor grit to enter; it assures sealed in smoothness . . .

National of ...california

Write for the fascinating story on regulators. 44 fact packed pages of interest.

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Circle No. 68 on Reader Service Card.

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Literature Featured In Ads This Month

(CIRCLE ON ENCLOSED POSTCARD NUMBERS OF LITERATURE YOU WISH TO RECEIVE)

52 **Electrode holders** that are duty-cycle rated are featured. JACKSON PRODUCTS, INC. Inside Front Cover.

47 **A welding machine for every job** can be found in brochures. HOBART BROS. CO. Page 1.

18 **Arc, gas and safety equipment** are featured in complete catalog. BURDETT OXYGEN CO. Page 2.

102 **Combination helmet/safety cap** is subject of literature. WILLSON PRODUCTS, INC. Page 4.

95 **Welding goggles** with full vision safety lenses are described. WATCHEMOKET OPTICAL CO., INC. Page 6.

76 **"Pay-Off-Pak"** is continuous coil of small diameter steel wire for automatic welding. REID-AVERY CO., INC. Page 60.

20 **"Bronze Welding Alloys"** is title of informative booklet. BRIDGEPORT BRASS CO. Page 45.

35 **Electrode holder and test installation** program are described. ERICO PRODUCTS, INC. Page 11.

28 **Hardsurfacing materials** are featured in catalog. COAST METALS, INC. Page 12.

94 **Production pipe notching** is explained in technical literature. VOGEL TOOL & DIE CORP. Page 14.

37 **How Ceramic backing rings improve pipe welding is explained.** GENERAL CERAMICS CORP. Page 15.

78 **Lifting and positioning clamps** are featured in 14-page catalog. J. C. RENFROE & SONS, INC. Page 16.

41 **Silver brazing alloys** are featured in data book. GOLDSMITH BROS. SMELTING & REFINING CO. Page 17.

7 **Everything for joining aluminum** is featured in handy pocket reference. ALL-STATE WELDING ALLOYS CO., INC. Page 18.

6 **Nickel - manganese electrodes** are featured in illustrated bulletin. ALLOY RODS CO. Page 19.

135 **Rectifier welders** are featured in Bulletin GEA-6242. GENERAL ELECTRIC CO. Page 38.

136 **Motor generator welders** are subject of Bulletin GEC-664. GENERAL ELECTRIC CO. Page 38.

137 **Electrodes with balanced design** are described in Bulletin GED-2584. GENERAL ELECTRIC CO. Page 39.

68 **Regulator story is told** in 44-page fact packed booklet. NATIONAL WELDING EQUIPMENT CO. Page 23.

56 **Automatic welding fixture** and "magic" features are explained. LEWIS WELDING & ENGRG. CORP. Page 41.

44 **Low-hydrogen electrodes** are subject of Report 5402. HARNISCHFEGER CORP. Page 29.

42 **Jacks, couplers and axles** are featured in three separate bulletins. HAMMER BLOW TOOL CO. Page 30.

VICKERS Controlarc DC Arc Welder Survives Punishing "Durability Test"

OVER 1,000,000 CYCLE HIGH-SPEED REPETITIVE ARC TACK TEST EQUIVALENT TO MORE THAN TWO YEARS OF CONTINUOUS USE

A 200-ampere CONTROLARC was subjected to a gruelling durability test. Every nine seconds the welder was charged with a six-second load of 250 amperes (50 amperes above rated capacity) at 27.5 volts. After 198,900 "makes" and breaks" the load was boosted to 300 amperes at 27 volts. When the test was concluded the CONTROLARC had survived 1,004,522 of these charges, with no apparent effect on any part.

For complete information about this rugged, dependable welder, write today for new bulletin.

Some Territories Open for Qualified Dealers. Write for Details.

VICKERS ELECTRIC DIVISION

VICKERS Inc. a unit of Sperry Rand Corporation

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Circle No. 92 on Reader Service Card.

AIRCO

WELDING and **BRAZING** *Hints*

PROBLEM:

To gas weld steel

SOLUTION:

Airco #1 Alloy Steel Rod. Designed for welding low carbon and low alloy steels. Provides high ductibility in "as welded" condition when welding with a neutral flame or with a slight excess of acetylene. It is smooth flowing, insuring good control of molten pool. Recommended for all general pipe and plate welding, aircraft structures and maintenance work.

Airco #4 High Tensile Welding Rod. Whenever current codes and product specifications allow the use of a lower priced, high strength rod, Airco #4 will meet all specifications. This rod is for producing welds in low alloy steel requiring minimum tensile requirements of 62,000 psi.

Airco #7 Mild Steel Rod. This low priced general purpose welding rod is popular in job shop and maintenance work for welding low carbon steel. In using this rod it is suggested that the weld metal pool be worked so as to include a fair amount of base metal in the mixture.

Send for this free catalog!

You'll find here the finest rods and fluxes for joining both ferrous and non-ferrous metals. Write Airco at address below.

Request Catalog 9-131W

AIRCO

AIR REDUCTION

New York 17, N. Y.

Offices and dealers in most principal cities
On the west coast—Air Reduction Pacific Company
Internationally—Airco Company International
In Cuba—Cuban Air Products Corporation
In Canada—Air Reduction Canada Limited

Circle No. 4 on Reader Service Card.

70 **Weld grinding wheels** are subject of literature. NORTON CO. Page 35.

3 **New oxy-acetylene welding** torch is featured in Catalog 818. AIR REDUCTION SALES CO. Page 37.

60 **Catalog of resistance welding products** is offered. P. R. MALLORY & CO., INC. Page 43.

14 **Heavy-duty gear-driven positioners** are featured in detailed engineering data. ARONSON MACHINE CO. Page 9.

57 **Combination AC-DC welder** is subject of Bulletin 1343. LINCOLN ELECTRIC CO. Page 49.

99 **Turning rolls and track supports** are featured in illustrated literature. WEBB CORP. Page 50.

59 **CO_2 dual gas welding method** is introduced in descriptive folder and technical bulletin. LIQUID CARBONIC CORP. Page 7.

9 **Hardfacing alloys** are subject of complete catalog. AMERICAN MANGANESE STEEL DIV. Page 64.

26 **Stainless steel metallizing wire** is featured. CRUCIBLE STEEL CO. OF AMERICA. Page 74.

50 **Nickel alloys and how to weld them** is story told in Bulletin T-2. INTERNATIONAL NICKEL CO., INC. Pages 76-77.

73 **How electrode ovens protect electrodes** from moisture pick-up is explained. PHOENIX PRODUCTS CO. Page 79.

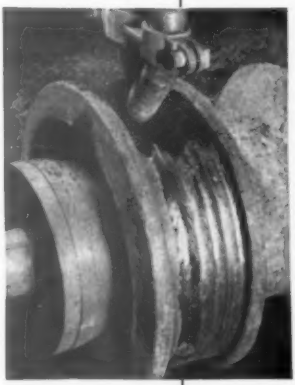
72 **Automatic welding wire in 26 analyses** are featured in Folder DH-402. PAGE STEEL & WIRE DIV. Pages 82-83.

66 **Heavy-duty weld sander-grinder** is subject of Folder SG-2. MILWAUKEE ELECTRIC TOOL CORP. Page 84.

NEW... Wear O Matic

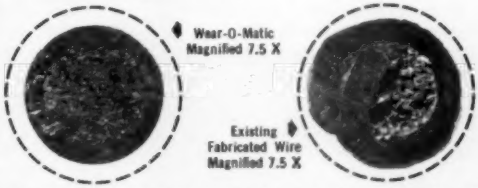
FABRICATED HARD-FACING WIRE

- for easier operation
- for uniform, high-quality welds



COMPARE

this major development in fabricated wire with existing wire . . .



These cross sectional views of fabricated wire were made under identical conditions. Notice the compactness and perfect roundness of Wear-O-Matic precision drawn wire as compared to existing fabricated wire. This dense, controlled diameter wire provides the smooth feeding and excellent arc characteristics of solid welding wire and insures a weld deposit that is uniform in soundness, chemistry and hardness.

Wear-O-Matic OFFERS THESE EXCLUSIVE FEATURES

1. Smooth, trouble-free feed with any automatic head—without special feed rolls or contact tubes.
2. Precision drawn for perfect roundness to insure continuous, smooth feeding.
3. Uniform compactness for uniform chemistry and hardness.
4. Electroplated with copper to prevent surface rust and insure positive electrical contact.

Make your own comparison . . .

Write for free sample specimen of new Wear-O-Matic wire—the only fabricated wire that's as easy to use as solid wire. Compare and prove to yourself why Wear-O-Matic is the wire you want now! Just write:

DRAWALLOY CORPORATION
Lincoln Highway at Alloy Street
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Drawalloy

CORPORATION

YORK 11, PENNSYLVANIA

Circle No. 32 on Reader Service Card.

ACCURATE GAUGE
To Determine Wear and

Ranite

Hardsurfacing needed to rebuild Caterpillar Idlers, Sprockets, rails, rollers and Grousers.

Ask your RANITE distributor for this free cut-away template (form A-7), or it will be sent direct to you upon request along with welding instructions for re-claiming tractor and shovel parts.

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Circle No. 74 on Reader Service Card.

12 **Metal removal on stainless steel** with carbon arc-air torch is explained in case history book. ARCAIR CO. Page 88.

96 **700 resistance welding electrodes** and other related products are featured in big, new catalog. WW ALLOYS, INC. Page 89.

62 **Low-cost metallizing installation** is featured in Bulletin 55. METALLIZING ENGINEERING CO., INC. Page 91.

101 **36 sizes of toggle clamps** are included in catalog. WEST POINT MFG. CO. Page 92.

55 **Portable AC arc welder** is subject of free folder. KASSON DIE & MOTOR CORP. Page 94.

89 **Resistance welding products** are subject of new catalog. TIPALOY, INC. Page 96.

31 **Head and eye safety equipment** is featured in catalog. DOCKSON CORP. Page 97.

85 **Thoriated tungsten electrodes** are described in technical folder. SYLVANIA ELECTRIC PRODUCTS, INC. Page 99.

54 **New regulator** with "built-in crash helmet" is introduced. K-G EQUIPMENT CO., INC. Page 101.

45 **A super-heat torch** is described in Folder 540710. HARRIS CALORIFIC CO. Page 105.

77 **Fume collectors** are subject of Bulletin 37-E. RUEMELIN MFG. CO. Page 106.

43 **Silver brazing of non-ferrous metals** is featured in Bulletin 20. HANDY & HARMAN. Page 108.

46 **Hard facing manual** is offered HAYNES STELLITE CO. Page 112.

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29 **Complete line of chipping hammers** is described in circular. CHICAGO MFG. & DISTRIBUTING CO. Page 114.

27 **Advantages of positioned welding** are listed in Bulletin WP26. CULLEN-FRIESTEDT CO. Page 115.

36 **Manganese-nickel steel products,** include electrodes, are described. FORD STEEL CO. Page 119.

69 **Portable grinder** is subject of illustrated folder. NEDCO CO. Page 119.

40 **Constant voltage welder** for automatic welding is described. GLENN CO. Page 127.

91 **Welding cable reel** is featured in descriptive literature. UNITED SPECIALTY CORP. Page 129.

34 **Welding fume exhausters** are subject of application data sheets. ENGWALD CORP. Page 131.

79 **Eight steps to better resistance welding are given.** S-M-S CORP. Page 131.

24 **Complete clamp catalog** is offered. CINCINNATI TOOL CO. Page 132.

15 **Magnetic clamps for welding** are featured. ARONSON MACHINE CO. Page 133.

53 **Clamps for pipe welding** are described. JEWEL MFG. CO. Page 135.

33 **Family of five electrode holders** is featured in illustrated brochure. DURO ENGINEERING CO. Inside Back Cover.

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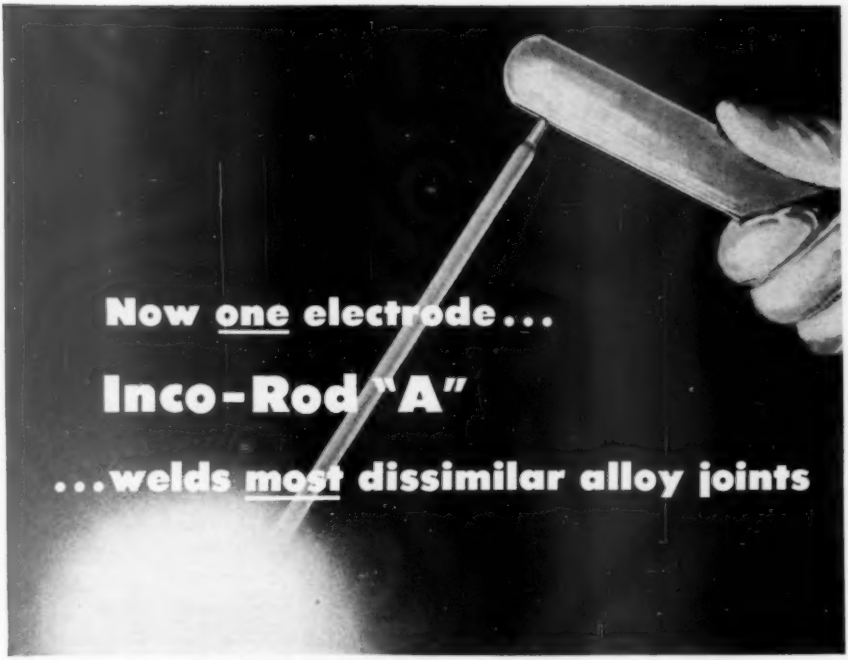

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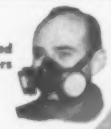

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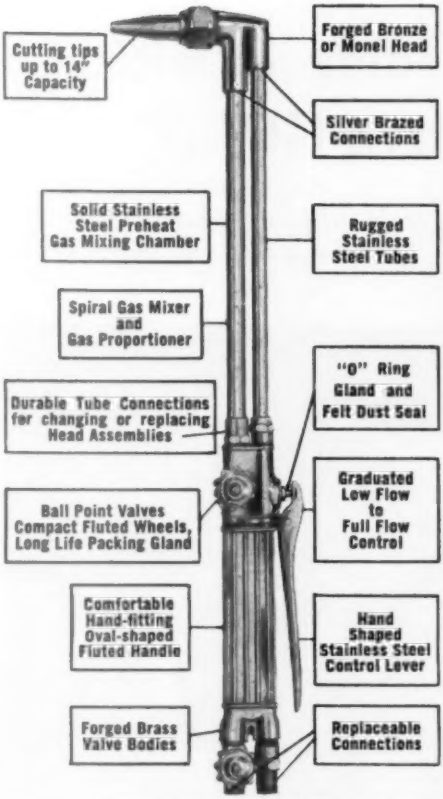
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Try this torch on your toughest cutting job . . . you'll find it keeps a cool head . . . time tested Victor spiral mixer and gas proportioner assures safe, economical operation.

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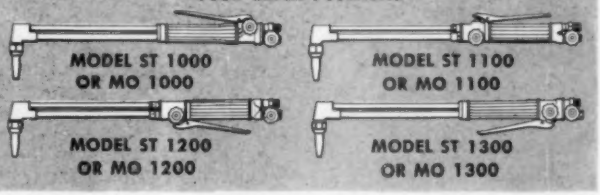

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The Norton line of weld grinding wheels is 100% complete . . . 100% top-performing

Norton Straight Wheel makes fast work of smoothing a heavy butt weld. This is a resinoid bonded wheel, made of Norton ALUNDUM® abrasive, the toughest, strongest abrasive you can use.

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From your lightest scale removal to heaviest duty cutting-away there's a type and size of Norton wheel that will do the job faster, for less money, and produce better results.

Norton portable wheels include all standard solid types, as well as the increasingly popular reinforced types, especially engineered for maximum strength, safety and versatility. They're built to *hug that work,* with more continuous contact, less vibration and bounce. Which means less operator fatigue and more metal ground off per man-hour — additional "Touch of Gold" advantages that boost your profits!

Your Norton Distributor will gladly help you select the right wheels from this complete line. Or write to NORTON COMPANY, Worcester 6, Mass. Distributors in all principal cities, listed under "Grinding Wheels" in your classified phone directory. Behr-Manning Corporation, Troy, N. Y., is a division of Norton Company. *Export:* Norton Behr-Manning Overseas Incorporated, Worcester 6, Massachusetts.

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Norton BD Rigid Hub-Type Wheel smooths a flame-cut edge. This heavy-duty Norton Reinforced Wheel is also excellent for cutting-away, smoothing heavier welds, making V-cuts for removing old weld material, etc.

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Norton BF Semi-Flexible Wheel blends a contour on a stainless steel part for a piece of pharmaceutical equipment — a material for which this lightest Norton Reinforced Wheel is especially suitable.

W-1564

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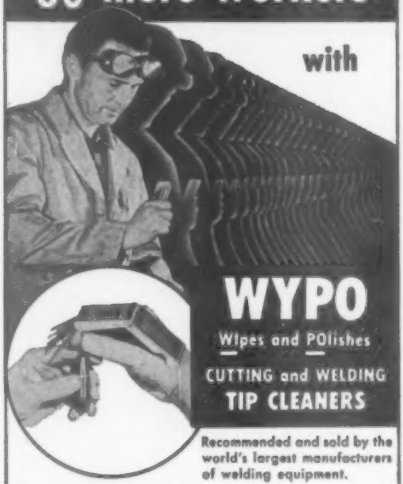

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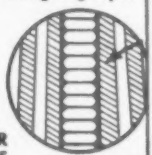
The exclusive circle design found only in Wypo Cutting and Welding Tip Cleaners provides as many as 60 more cleaning edges per inch of cleaner.

Straight sided valleys, another outstanding feature of Wypo Tip Cleaners, insures a thorough cleaning and removal of all waste.



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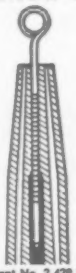

U.S. Patent No. 2,429,581
In Canada 1948

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MAITLEN AND BENSON INC.
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LETTERS TO THE EDITOR

Reclaiming by Welding

Gentlemen:

Within the past 18 months an article appeared in your magazine described in detail a process developed by a Buffalo, N. Y., company for reclaiming eroded and corroded extrusion screws by welding.

We are interested in whether you can give us the name of this company and whom we might contact to inquire further about this type of work.

Your early reply will be appreciated.

J. W. Kindell, Plant Buyer
E. I. duPont de Nemours & Co.

Complete information has been forwarded to Mr. Kindell and his request routed directly to the company whose interesting application was described.

Two Interesting Subjects

Gentlemen:

Will you please send us copies of the following articles which were annotated in the A.S.M. Review of Metal Literature:

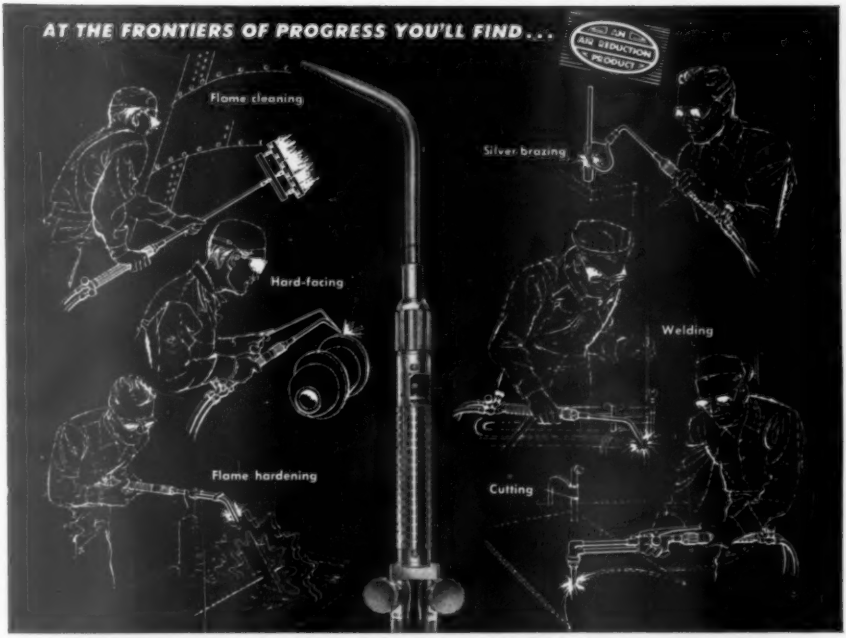
Carbon Dioxide—Will It Replace Argon and Helium for Inert Arc Welding? June, 1955, p. 56-61, 94.

Titanium Can Be Brazed and Soldered. June, 1955, p. 62-66.

A. M. Bounds, Ch. Metallurgist
Superior Tube Company

These have been sent to Mr. Bounds with our compliments.

(Turn to Page 38)



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- flame harden and descale
- cut steel to 8" in thickness

Airco's high gas flow capacity and precision-drilled mixer provide the smooth constant supply of well mixed gas and steady flame that makes for top performance on *all* jobs, *regardless* of size.

Over 30 types of tips – each instantly interchangeable – from size 0 single flame up to size 15 multiflame – are available. You can get either long or bulbous flame. Separable tips may be used with a Universal or Jet mixer. Cutting attachments will enable you to cut up to 8" plate. Contact your nearest Airco office or authorized Airco dealer; ask for your Catalog 818.

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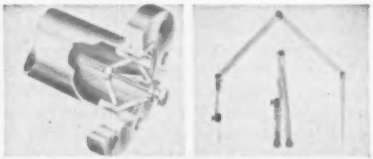

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of California

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SOLD BY WELDING SUPPLY DEALERS

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LETTERS TO THE EDITOR . . .

(Continued from page 36)

Lightweight Welding Goggles

Dear Sirs:

In your magazine, *Industry & Welding*, a new lightweight welding goggle is shown that is made by Dockson Corp.

We would like to secure more information about the goggle and would appreciate receiving their complete address for this purpose.

A self-addressed, stamped envelope is enclosed for convenience.

W. J. Greenlee, Personnel
Director, Victor Chemical Works

Complete information has been forwarded by Dockson Corporation.

Now A Qualified Reader

Dear Sir:

In answer to your recent letter of inquiry, we manufacture a line of wrought iron, both furniture and accessories, in which we have both manual and spot welding operations. We also fabricate special equipment and machinery.

If the above qualifies us for your list of readers, would be very happy to receive your publication.

Roger V. Bollier
Colfax Furniture Co., Inc.
Colfax, Indiana

It does—and we have now entered Mr. Bollier's subscription.

We're Glad to Do It!

Dear Sir:

We have had occasion to read several editions of the *Industry & Welding Magazine* and have found

(Continued on Page 134)

YES, we were 1ST in

1. High impact Tip Insulators to reduce maintenance costs.
2. Interchangeable Tip Insulators to reduce maintenance stock requirements.
3. High heat resistant Plastic Tip Insulators to withstand higher temperatures near welding arc assuring longer life.
4. Plastic Handles to prevent moisture absorption and warpage as well as insulate glove from Holder heat.
5. High conductivity copper for lower tong to carry away inducted heat from rod, as well as high electrical conductivity.
6. Spring Adjustment Screw for ease of Rod release.

7. Wrap around Plastic Tip Insulation for maximum electrical insulation and heat resistance — 30% more than any other make.

AND NOW.... 2 MORE FIRSTS

Wagner HI-AMP ELECTRODE HOLDERS

8. Brilliant Red and Yellow Plastic Colors insures identification of Holder anywhere in plant — Valuable Safety Feature.

YES—

WAGNER HI-AMP LEADS THE FIELD IN ELECTRODE HOLDERS

You will never use any other Electrode Holder once you actually "see" and "feel" the difference.

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WAGNER MANUFACTURING CO., *inc.*, JACKSON, MO.

Weld with Wagner

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Fewer Wheel Changes . . . More Production with MANHATTAN MOLDISCS

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Manhattan Moldiscs are available in a wide range of types from harder, stiffer bonds for fast roughing . . . to more flexible and resilient bonds for fine finishing. Ask a Manhattan representative to show you why Manhattan Moldiscs, like all Manhattan high speed, heavy duty abrasive wheels last longer . . . give you "More Use per Dollar".

RM-633

GRINDING WHEEL INSTITUTE MEMBER

WRITE TO ABRASIVE WHEEL DEPARTMENT

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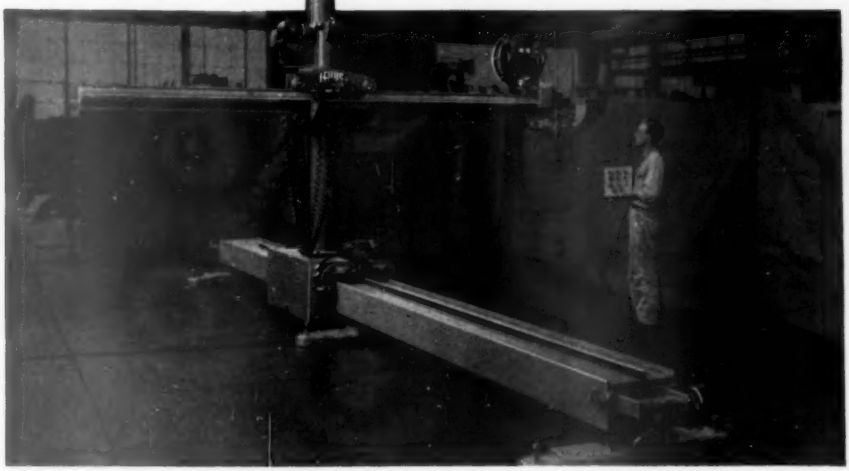
it's almost magic...



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Difficult precision welds are made with robot-like regularity . . . with a LEWIS "Universal". This fully-adjustable fixture reduces the time, sweat and high costs normally associated with large weldments . . . and does it so easily it's almost magic!

Exclusive "Universal" features include portability . . . simultaneous 3-directional operation . . . remote pushbutton control . . . use of any standard head for welding, flame cutting or hardening . . . fast set-up and easy operation by one man.

But these are only a few outstanding LEWIS "Universal" advantages. For complete details and prices, write today or call BEdford 2-2500.

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Circle No. 56 on Reader Service Card.

NEWS of the WELDING INDUSTRY

K-G Elects Schmuldt to Vice Presidency

Karl H. Schmuldt has been named to position of vice president-sales at the K-G Equipment Company, according to George F. Pool, executive vice president.

Prior to his election, Schmuldt held several important offices in the company, including that of sales manager.

Suydam Named President of Linde Air Products

An appointment of great interest in the welding industry is the elevation of E. B. Suydam to the presidency of Linde Air Products Company, a division of Union Car-

bide and Carbon Corp. Suydam succeeds T. D. Cartledge who continues as a vice president of the corporation.

Suydam joined the Union Carbide organization in 1916 as a salesman for Union Carbide Sales Company. He remained with that company until 1928 when he was named manager of Linde's Southwestern Region. In 1929 he returned to New York to become gas sales manager of Linde and moved up to the position of general sales manager in 1940. He became vice president in 1942.

Meredith Joins Airline Welding

Harlan L. Meredith has accepted a position as Staff Assistant at

Airline Welding and Engineering in Hawthorne, Calif. He will work on research welding and process tooling development projects. Formerly a research welding engineer for N. A. A. Aerophysics Plant in Downey, Calif., Mr. Meredith is Chairman of the A.W.S. Aircraft and Rocketry Welding Panel in Los Angeles and is a West Coast Committeeman on Welding Symbols.

(More News on Page 44)

Why "Do It Yourself"

Standard MALLORY Electrodes *Cost Less, Weld Better*

Makeshift, "home made" welding electrodes can cost more than you realize. Not only do they take a lot of time to contrive, but they seldom have the strength, conductivity and cooling facilities to give good welds and satisfactory life.

Before you "do it yourself," take a look at what Mallory has to offer, in the way of unusual electrode shapes. Literally hundreds of single and double bend electrodes that you may consider special are standard Mallory designs . . . which we can make promptly and economically using existing tool facilities.

Exclusive Mallory cold-forming techniques shape these bent electrodes from full hard rod stock, and develop high hardness and strength far beyond what can be obtained by conventional hot forging methods. Cooling tubes may be bent in place* by a special process, to provide water flow as near to the welding face as in the case of straight electrodes. These extra values designed into Mallory electrodes assure you of long life, long runs between dressings . . . more welds per dollar.

For information on available designs, ask your local Mallory Welding Distributor for a copy of the latest Mallory Welding Catalog, or write directly to us.

P. R. MALLORY & CO. Inc.

MALLORY

P. R. MALLORY & CO., Inc., INDIANAPOLIS 6, INDIANA

*Patent Number 2489993

For information on titanium developments, contact Mallory-Sharon Titanium Corp., Niles, Ohio

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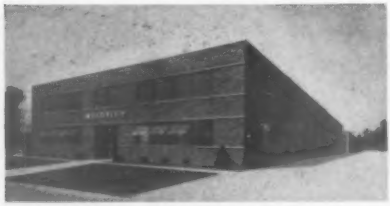

Weldaloy Moves to Larger Plant

As a part of their expansion program, Weldaloy Products Company have recently moved to newly built facilities in Van Dyke, Michigan, a Detroit suburb, according to James O'Grady, president. The new facilities will contain the firm's general offices in one building and the foundry and metallurgical laboratory in another.

Mr. O'Grady reports that the new facilities will aid efforts toward further expansion in product development, and will result in an increased production rate of resistance welding products.

Midwest Welding Conference A Great Success

A two-day welding conference featuring papers on welding in nuclear reactors, designing for welding, latest developments in electrodes and the CO_2 welding process was held early in February at Armour Research Foundation of Illinois Institute of Technology, Chicago. The meeting was sponsored jointly by the Institute and the Chicago Section of the American Welding Society.

This was the second annual conference, and the attendance greatly exceeded last year's.

Reid-Avery Founder Dies

Marshall E. Reid, 69, founder and chairman of the board of Reid-Avery Company, Baltimore, died recently after a lengthy illness. Mr. Reid founded Reid-Avery in 1919. Since then, the firm has become one of the nation's leading manufacturers of arc welding electrodes and welding wire.

The company will continue operations as in the past with C. L. Virden as president.

Acorn Celebrates 50th Anniversary

Acorn Iron & Supply Co., Phildelphia, Pa., recently celebrated its 50th anniversary, according to Saul Volchok, sales manager. Founded in 1905 by Samuel Tabas, the company has grown from a single phase business to a multi-endeavor one, which now includes ownership and operation of industrial buildings and commercial properties. Since that time the firm constantly expanded until today it has a modern, completely equipped plant with railroad sidings and waterfront shipping accommodations.

SAMUEL TABAS

The company, which manufactures welding platens and bending blocks, among other products, is still operating under the leadership of Mr. Tabas. He is currently being assisted by his two sons, Charles L. and Daniel M.

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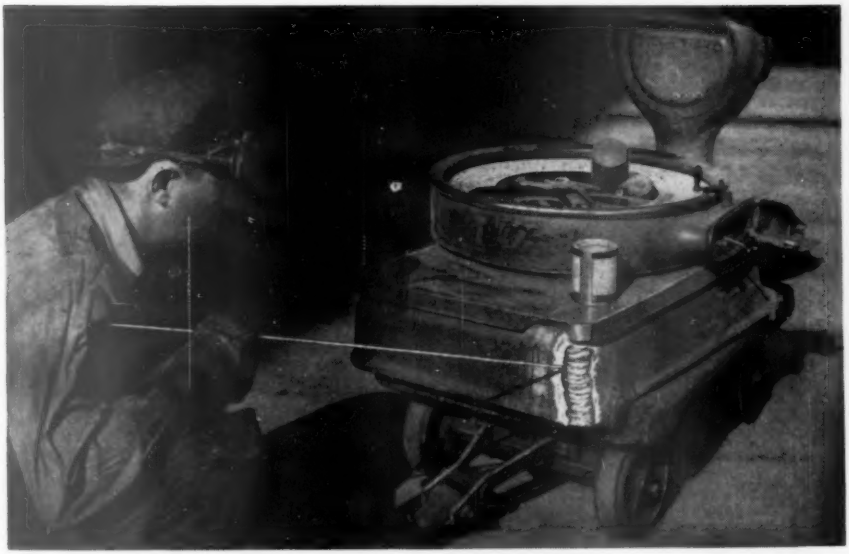

SAVE COSTLY REPLACEMENTS

...get fast, strong repairs with Bridgeport No. 192 Low-Fuming Bronze Rod

This scale was a vital link in a plant's materials weighing section. Operations slowed down when its cast iron frame was smashed. Braze welding with Bridgeport No.192 Low-Fuming Bronze Rod had it back on the job good as new in a matter of hours... another example of time and money saved through repair with braze welding.

Bridgeport No. 192 is a low-fuming manganese-type, all-purpose rod recommended for both repair and production welding. It tins readily and the base metal needs relatively little local preheating, thus avoiding brittleness. Many repairs are possible without disassembling or moving heavy equipment. And welds are frequently stronger than the base metal.

Write today for your free copy of Bridgeport's new booklet, "Bronze Welding Alloys."

Bridgeport Brass Co.

BRIDGEPORT BRASS

Offices in Principal Cities • Conveniently Located Warehouses

Bridgeport Brass Company, Bridgeport 2, Conn. • In Canada: Noranda Copper and Brass Ltd., Montreal

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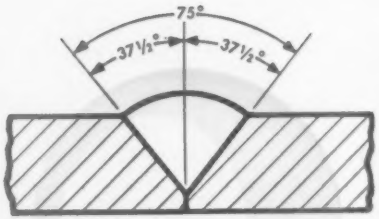

The 37½° Bevel for Pipeline Welding

by R. G. STRONG
Director of Engineering
Natural Gas Pipeline
Company of America
Chicago, Illinois

WHICH bevel, 30° or 37½°, results in the *best* pipeline welds? This question has generated a healthy controversy in pipeline welding circles especially when the American Petroleum Institute adopted the 37½° mill bevel as a manufacturing standard for line pipe.

It is our feeling that published material on this subject would not be complete without supporting testimony for the 37½° bevel. The following summary of the experiences of Natural Gas Pipeline Co. of American and Texas Illinois Natural Gas Pipeline Co. definitely are in support of the wider-bevel angle.

500 Miles, 337 Leaks

Our experience in favor of the wider-bevel angle really began during 1947 and 1948. In those years about 500 miles of 26-in. loop lines was laid by Natural Gas Pipeline. This included loops along all sections of the main line from Texas to Chicago.

On this construction project 337 leaks were found in welds. Almost every section of the new lines had some leaks. All pipe used in this construction was mill beveled at 30°.

With this background, when planning started for the Texas Illinois pipeline, it was decided to make an intensive study of pipeline welding practices and equipment.

Various types of welding rods were studied and compared. Geometry of bevels, contours of weld deposits, and methods of inspection and nondestructive testing were considered as part of the over-all study.

Study Bevel Shapes

The study of bevel shape and contour of the deposited bead was particularly emphasized at this

Disagreements exist as to the preferred bevel for line pipe. The case for the 30° bevel was published in INDUSTRY & WELDING Magazine, November, 1955, p. 62. The case for the 37½° bevel was presented in a recent issue of the OIL and GAS JOURNAL by the author who said:

- *A comparison of results obtained in using both 30° and 37½° bevel on 2,000 miles of pipeline strongly favors the wider bevel.*
- *Finished root bead has better contour, thereby better, accessibility, has fewer slag inclusions, less undercutting and provides for greater ease in cleaning.*
- *Broad recognition and long periods of exploration in bevel end preparation strongly recommends the 37½° bevel angle as an accepted standard.*

time. Angles of bevel were studied from the standpoint of strength and cleanliness of the weld.

These studies showed that all types of bevels would produce about the same strength weld if proper penetration could be attained. Thus, it was apparent that the best bevel would be one allowing for good penetration of the root bead, giving good surface contour of the root and subsequent passes, and having a wide enough opening for proper cleaning between passes. The 37½° bevel answered these requirements.

Undercutting Traps Slag

Bevels of 30° and less resulted in convex underbeads with crowns so high as to cause severe undercutting on the sidewalls. This undercutting made a trap for slag and created a very difficult cleaning condition.

Conversely, with 37½° bevel, the underbead contour was almost flat. Cutting into sidewalls was minimized and thorough cleaning between passes could be done with ease and without spending undue time.

The 45° bevel was not a great improvement over the 37½° bevel in the matter of penetration and ease of cleaning. Also, it opened the groove so far that welding economy was seriously affected.

Concentrate on 37½° Bevel

Therefore, the 37½° bevel was selected as the one for concentrated studies. A number of test welds were made using this bevel to secure a pattern of defects. Particular attention was paid to burn-through and "wagon tracks." It was found that with proper welding techniques, both these types of defects could be held to a minimum. Further, with a reasonable amount of cleaning, very sound and homogeneous welds could be produced.

Based on the work done at that time, the 37½° bevel was adopted

Chances for a good weld are higher if the bevel is wide, according to author, who is a recognized expert in the pipeline welding field.

for use in laying the Texas Illinois main line.

Results

On the 1,400-mile, 26 and 30-in. main line of Texas Illinois, laid in 1951, only 12 leaks occurred in welds. Compare this with the record on the loops of Natural Gas Pipeline where the 30° bevel was used.

There is every reason to believe that the wider-bevel angle played an important part in this improved record. Laying conditions were comparable. Proficiency of the welders should have been about equal. Closer inspection was in part responsible for the good record, since radiographic inspection was used on the Texas Illinois and not on the N.G.P.L. loops. But still, the wider-bevel angle must be given much credit for the better welding.

An early difficulty was experienced in welding of 30-in. pipe on the Texas Illinois line. This was a severe underbead cracking of the stringer. The cause was soon found and corrected and had nothing to do with the bevel angle.*

Question All Concerned

While studying the cause for the underbead cracking, attention was again given to the bevel angle as a possible source of difficulty. Welders, welding supervisors, inspectors, and outside technicians were questioned. All parties concerned absolved the wide bevel as the cause of trouble. In fact, all considered the 37½° bevel to be superior to the 30°.

Welders in particular favored the wider angle. It offered them more chance for sound, clean welding than did the smaller bevel.

Based on the above experience, we continued to use the 37½° bevel and have adopted it as standard for pipeline welding for this company.

Penetration Without Undercutting

One important function of the wide angle bevel is that it allows better penetration of the root with-

8 reasons why production welding should be done with LINCOLN

IDEALARC

1. Choice of AC or DC welding current . . . whichever is best for your job. The ideal welder for production line operations.

2. Dual control gives soft arc and forceful, non-sticking arc . . . Idealarc gives you both, in AC and DC.

3. Easy Striking . . . Lincoln Arc Booster gives easy striking for both AC and DC to assure positive arc starting.

4. Steady arc that is easiest to hold with any electrode in any position, AC and DC.

5. Dependable operation under the heaviest loads... with complete overload protection against burnout.

6. Simplest installation . . . operates on single phase power.

7. Available as a straight AC welder to which DC can be added at any time.

AND THE BEST REASON OF ALL

8. LOWER COST PER WELD through faster AC and DC welding with Lincoln's new iron-powder electrodes:

JETWELD 1 for welding flat and horizontal fillets.

JETWELD 2 for welding flat, deep grooves and horizontal fillets.

JETWELD 2HT for welding flat position, deep groove joints and fillets in low-alloy, high tensile steels.

"Improved" **FLEETWELD 47** for fast, smooth, all-position welding.

Hadn't you better check LINCOLN now?

Have Lincoln's factory-trained specialist show you how IDEALARC and these new Lincoln electrodes will give you better production, lower costs. Write for Bulletin 1343.

THE LINCOLN ELECTRIC COMPANY

Dept. 1812, Cleveland 17, Ohio

The World's Largest Manufacturer of Arc Welding Equipment

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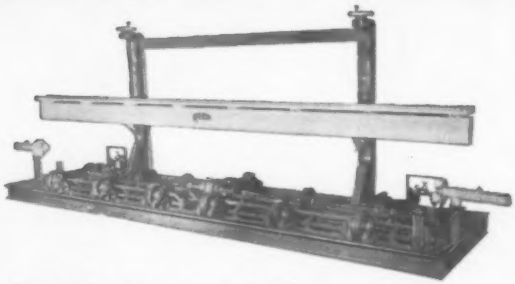
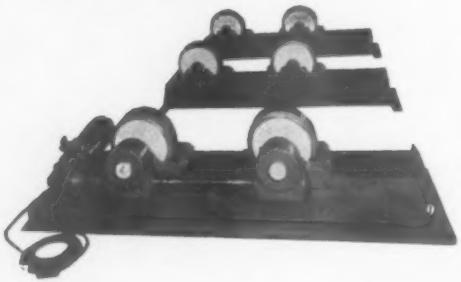
WEBB TANK PRODUCTION MACHINERY

REED TRACK SUPPORTS
For Automatic Welding Head Carriages

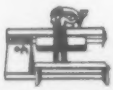


Increase production — use this fixture on 4' to 12' diameter work. Welding track is 24' to 34' long. Powered vertical adjustment is available for all models. May be used with your present turning rolls, welding positioners, special jigs for straight seam work, or portable type rolls illustrated below.



REED Portable Type TURNING ROLLS

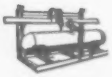
For manual or automatic welding and other operations requiring rotation of a cylindrical vessel. Capacities range from 3 tons to 75 tons; larger units built to special order. Powered by electric motor with variable speed transmission. Readily portable, they may be used free or anchored to the floor as desired.



Horn Type Fixtures

Cylinder Flange Offsetters

Assembly Fixtures



Unit Type Turning Rolls

Portable Turning Rolls

Automatic Welding Track Supports

FOR ILLUSTRATED LITERATURE WRITE DEPT C.

REED EQUIPMENT DIVISION
THE WEBB CORP. WEBB CITY, MO. U. S. A.

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"all types of bevels would produce about the same strength weld if proper penetration could be attained"

out severe undercutting. The mechanism for this may be explained in this way:

The first or stringer-bead pass is put in with a very short arc. In fact, this arc is wholly contained in the flux cup at the junction of the pipe bevels. Here the angle of bevel and cup of the rod controls the final contour of the bead.

Because of the lesser amount of parent metal in the root of the wider groove, there is less chilling action from the parent stock; more heat is liberated to flow into the parent stock; and a greater puddle action is achieved to allow the side wash. Thus a flatter bead surface with less sidewall undercutting is produced. Consequently, slag entrapment is not as severe and can be more readily and more thoroughly removed.

Grain Structure

One objection advanced against the 37½° bevel is that it results in a coarse grain structure in the finished weld because of need for more weld metal and consequent longer heat cycles.

Any discussion on grain structure at the fusion line is one that is subject to a considerable amount of questioning. Temperature of the pipe and of the atmosphere can have a marked effect on grain size. Welding procedure, itself, has a marked effect on grain size—both in the junction line and in the heat-affected zone. The microstructure in the heat-affected zone can vary considerably from top to bottom of the weld and any comparison would depend largely upon the exact location as to true meaning of this.

The main point in the microstructure would be width of the heat-affected zone in the pipe and the grain structure when considered in the light of the entire area from top to bottom. Coarse grain structure in itself does not necessarily mean brittleness and other factors are of more importance than grain size. Until field welding is much more closely controlled than is possible today, this factor will remain relatively unimportant.

Costs and Time

That a wider bevel takes more weld metal, increases electrode costs, and adds to labor costs cannot be denied. But it is our thought that no one in the pipeline industry will sacrifice weld quality for a small saving in over-all costs.

In the matter of greater welding time being required with the wider-bevel angle, it is doubtful that this would be apparent on a long line. We are not yet to the point where every minute of every welder's time is spent under a hood. The time needed to deposit the extra metal in the wider groove would hardly be noticed in a cost analysis of a main line spread's operation. Further, the increase in time and effort of the wider angle is compensated for by the fact that experience shows that leakage, and the subsequent necessary repair of the joints, is kept to a minimum.

More Clearance and Control

One of the most important ad-

(Continued on page 115)

When Revo-File Co. switched to braze welding with Anaconda Rods

Production increased

Costs went down

Quality went up

Close-up of braze weld in panel corner. Panels are #18 gage mild steel. **Below:** A corner after sanding — the basis for a smooth, perfect enamel finish.

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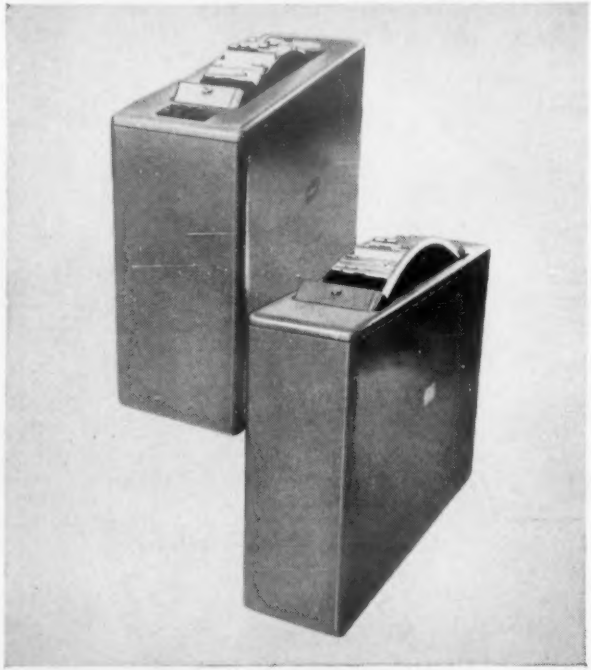

Revo-Files, marketed by the Mosler Safe Company. Unit at left is electrically operated – a touch on a button brings desired section of revolving file into place. Right-hand unit is manually operated. Corners of top and two end panels, plus seams on the locking covers, are braze-welded.

14 superior braze welds in 7 minutes

The Revo-File Company of Freeport, L. I., used to arc-weld panel corners and locking-cover seams on its revolving-file cabinets. But they were troubled by lack of penetration and by considerable porosity.

About six years ago, the Company turned to oxyacetylene braze welding, using Anaconda-997 (Low Fuming) Bronze Rod. They found that the rod flows smoothly, is easy to control – reducing the time required to make the welds. It takes only 7 minutes to complete 14 welds, an average of 30 seconds per weld.

In addition, the welds are uniformly sound and well-formed, reducing finishing time. Thus, for Revo-File Company, the switch meant better product quality, lower costs, and increased production.

Anaconda-997 (Low Fuming) Bronze is a superior welding rod used to join gray and malleable cast iron, steel, and copper alloys by the oxyacetylene process. It is one of a broad line of Anaconda Welding Rods that are finding increasing applications in production and repair welding. Anaconda Welding Rods are sold by distributors of welding equipment everywhere. Whitehead Metal Products Co. of New York furnish Revo-File Co. with Anaconda rods. See your Anaconda distributor or write: The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. 55127

ANACONDA® WELDING RODS

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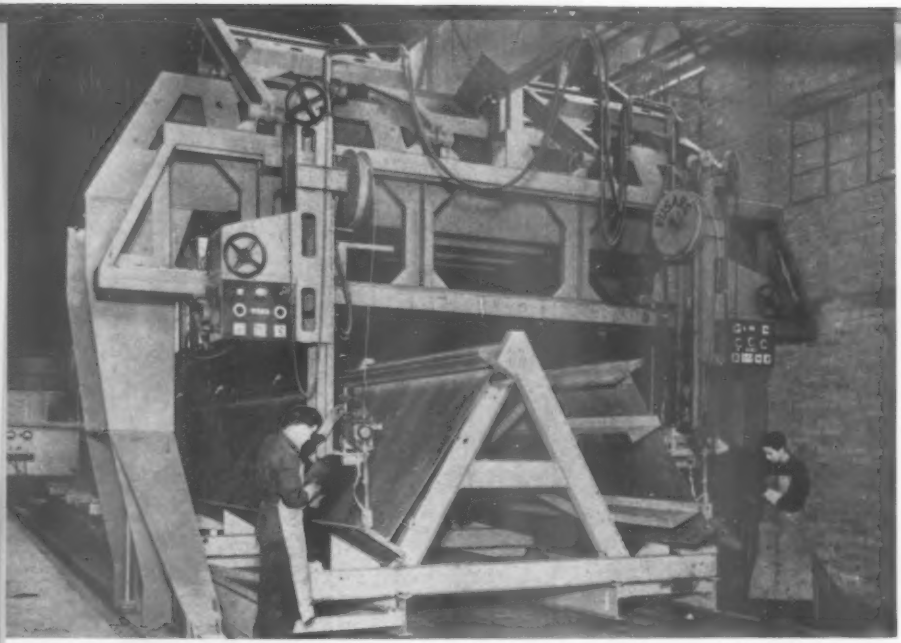

Travelling gantry installation carrying two submerged arc welding heads for simultaneously welding flanges to webs on 60-foot heavy plate girders.

Here's How to Position

IT is generally recognized that use of suitable positioners with normal manual arc welding can greatly increase output and reduce costs. While it is possible to carry out manual arc welding without the benefit of positioning equipment, automatic arc welding nearly always requires the correct types of positioning and handling devices which alone can make production welding economical.

Installation of an automatic welding unit represents a considerable capital expenditure. Therefore, it is important to use a positioner which has a variety of applications within the sphere of work normally undertaken by the firm concerned. There are, of course instances where repetitious work is involved, such as the assembly in large quantities of automobile components. On work of this kind a decision as to the type of positioning equipment to be adopted is not difficult to make. Special-purpose positioners, frequently built as a part of the welding plant itself are nearly always justifiable.

Standardize Whenever Possible

However, the problem confronting most production men is to obtain the most flexible positioning equipment to suit varying require-

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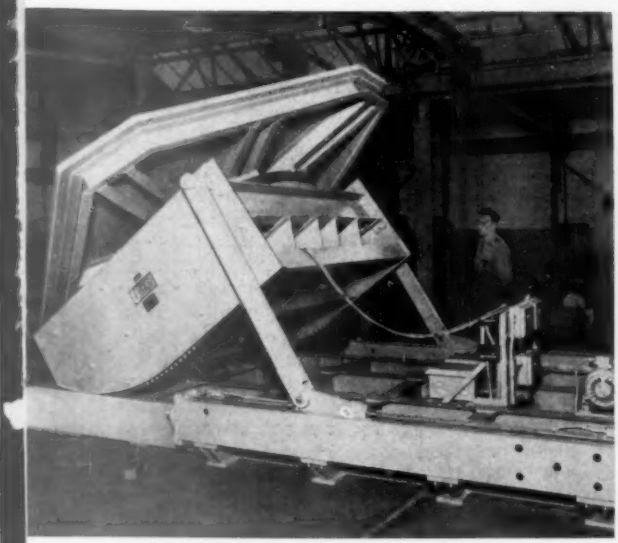
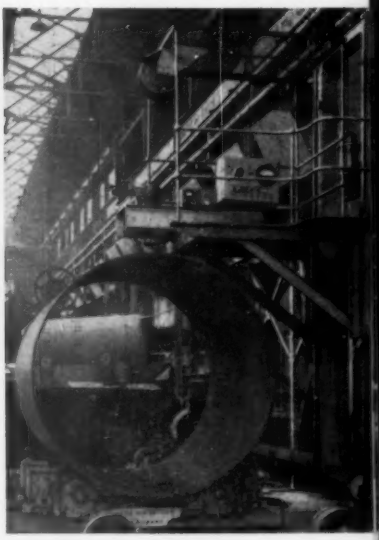


Rocking manipulator eliminates need for heavy gearing used on trunnion type units.



Travelling carriage is used in conjunction with turning rolls.

Your Automatic Welding

ments, both in the present and future. Whenever possible, standard equipment in the form of power-driven turning rolls or universal-type positioners should form the basis of the automatic installation, and improvised fixtures can be added to these for any particular unexpected job that may come along.

Two types of standard positioners finding increasing application are the rocking manipulator and the self-balancing positioner. The former was developed to overcome disadvantages associated with the trunnion-type positioners, such as high loading position and heavy gearing for the tilting mechanism. The weight of both the machine and the workpiece is carried on rockers giving a perfect tilting movement to bring the workpiece into the best welding position.

Self Balancing Positioner

The standard self-balancing positioner has many advantages in work handling. The worktable can be revolved through 360 degrees, and can be tilted, in many instances, more than 90 degrees from the horizontal. It is balanced in such a way that it permits free hand positioning of many weldments, using only a light touch.

Positioning can increase the speed and efficiency

Standard heavy-duty positioners usually incorporate a motorized table turn and tilt. The worktable can be rotated through a variable-speed drive to provide a speed to suit the work diameter or welding speed.

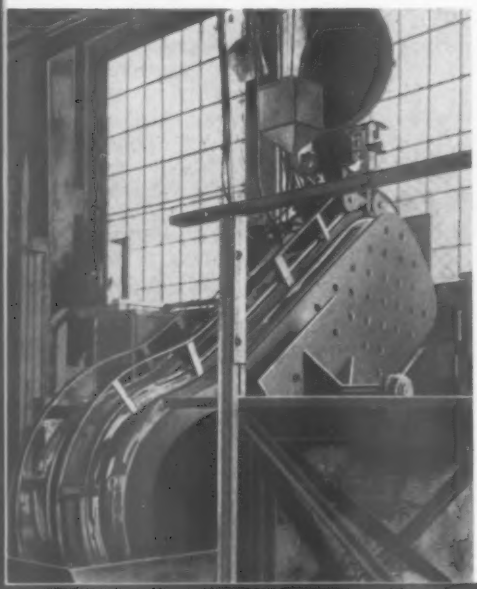
Turning Rolls

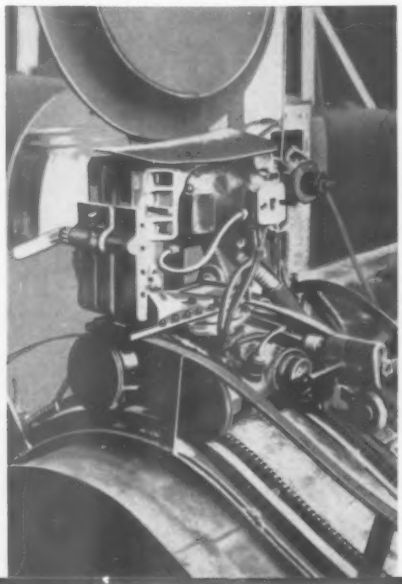
Another recent development in equipment for rotating vessels of varying sizes are multiple-track rotators which basically comprise endless rubber-covered flexible roller chains which shape themselves to the contour of the cylinder, acting both as a sling and conveyor, and producing a smooth and regular speed of rotation. Possible loss of tractive effort through the older method of single-point contact is thus avoided and there is less likelihood of the cylinder corkscrewing, a vital consideration if a stationary automatic head is being used on a circumferential seam. A screw adjustment of only 7 inches is necessary to alter the treads to accommodate cylinders varying in diameter from 4 feet to 10 feet. Vessels of 36 tons have been handled by this system.

Transverse travelling carriage rotators, a development of standard turning rolls, enables both automatic circumferential and longitudinal welding to be carried out with equal facility. There is a dual drive to rotator trolley. Rotators can be moved inwards for varying diameters as well as lengthwise.

Combining Two Different Types

The past 10 years have witnessed a steady increase in the number of automatic installations with positioning arrangements built-in as an almost inseparable part of the whole plant. A typical automatic installation consists of high capacity turning rolls and a travelling column which carries an elevating platform. From this platform, a





of automatic welding . . .

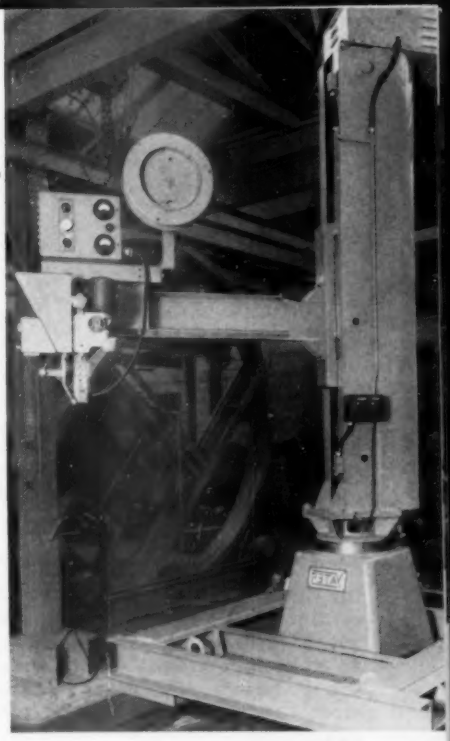
single operator controls the positioning equipment carrying the cylinder, the travelling column and elevating platform, and the automatic welding equipment.

An entirely different type of installation, which has application in a heavy structural engineering works, is a large traveling gantry installation. Welding head on this type is carried on a transverse traveling carriage attached to the cross member. The advantage of such an installation is that it allows wider movement of the welding head in the transverse direction.

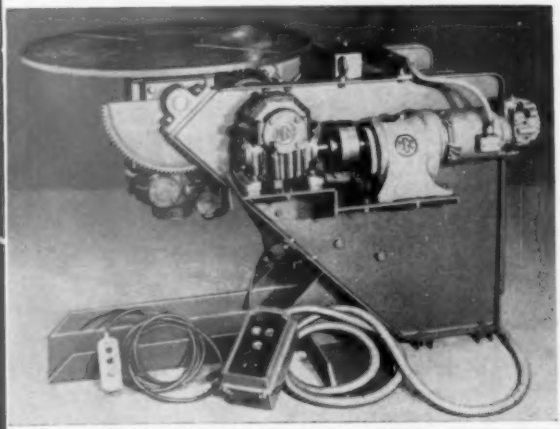
Make Use of Headroom

It is of interest to note that the trend in handling bulky and heavy weldments is away from the earlier principle of sinking large pits in the shop. It has been found more economic to utilize headroom and create units which have a considerable vertical adjustment range

(Continued on page 58)

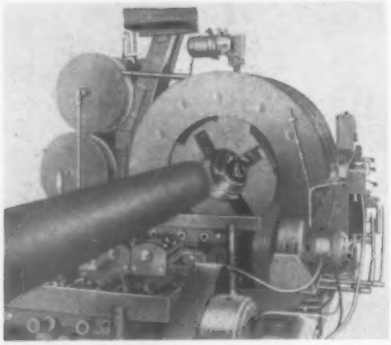


Rotating column type unit has elevating horizontal arm or ram which carries the automatic head.

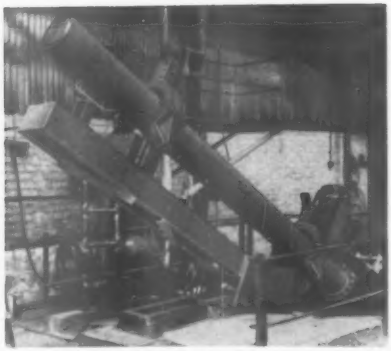


Positioning equipment for fabricating Scotch-type marine boilers (far left). Close-up (left) shows levelling device.

Universal positioner made in Britain is fitted with a drive for elevating the worktable. This type has considerable utility.



External chucking is used in a fixture for automatic butt welding of heavy pipe. Welding head is located between the two chucks.



Special positioner automatically welds flanges to high pressure pipe. Positioner tilts into a pit where the welding head is located.

for the welding head. The rotating column-type plant with the horizontal arm capable of elevation, is an example of the latest trend, and shows how easily height adjustment can be effected with modern equipment.

One of the main objects of all positioning equipment is to increase actual arc time to the maximum. Frequently there may be more than one way of achieving a satisfactory operating cycle. Although automatic profile welding has become a reality recently in Britain, the majority of automatic welding heads are used for either circumferential work or for longitudinal seams. Thus positioning equipment is designed for either of these functions or, in some instances, both.

Circumferential Positioning

There are five main methods employed for circumferential positioning: Standard rotatable manipulators used with a fixed automatic head; turning rolls; mandrel or spindle-driven fixtures for smaller work; internal and external chucking fixtures, usually with fixed automatic head; headstock and tailstock units for work of varying sizes.

A typical example of the use of the standard rotatable manipulator is the flanging of pipes. This can be an awkward job largely because the pipes are bulky and not easily handled, and the flange is small. Positioners for this application have been designed to cope with a wide range of pipe diameters and flange sizes.

The use of turning rolls is apparent and familiar to fabrication people. The author is familiar with an interesting variation where turning rolls were used with a granular welding flux held against the joint on the underneath side. A conveyor belt was used for carrying this flux and run under the liner being welded. Rollers bearing against the external surface of the liner maintained the correct degree of contact of the flux with the steel. This method eliminated the need for a backing strip or welding from both sides.

Spindle-driven fixtures usually have a driven headstock and a clamping tailstock. They are used for smaller classes of circular as-

Worn gears

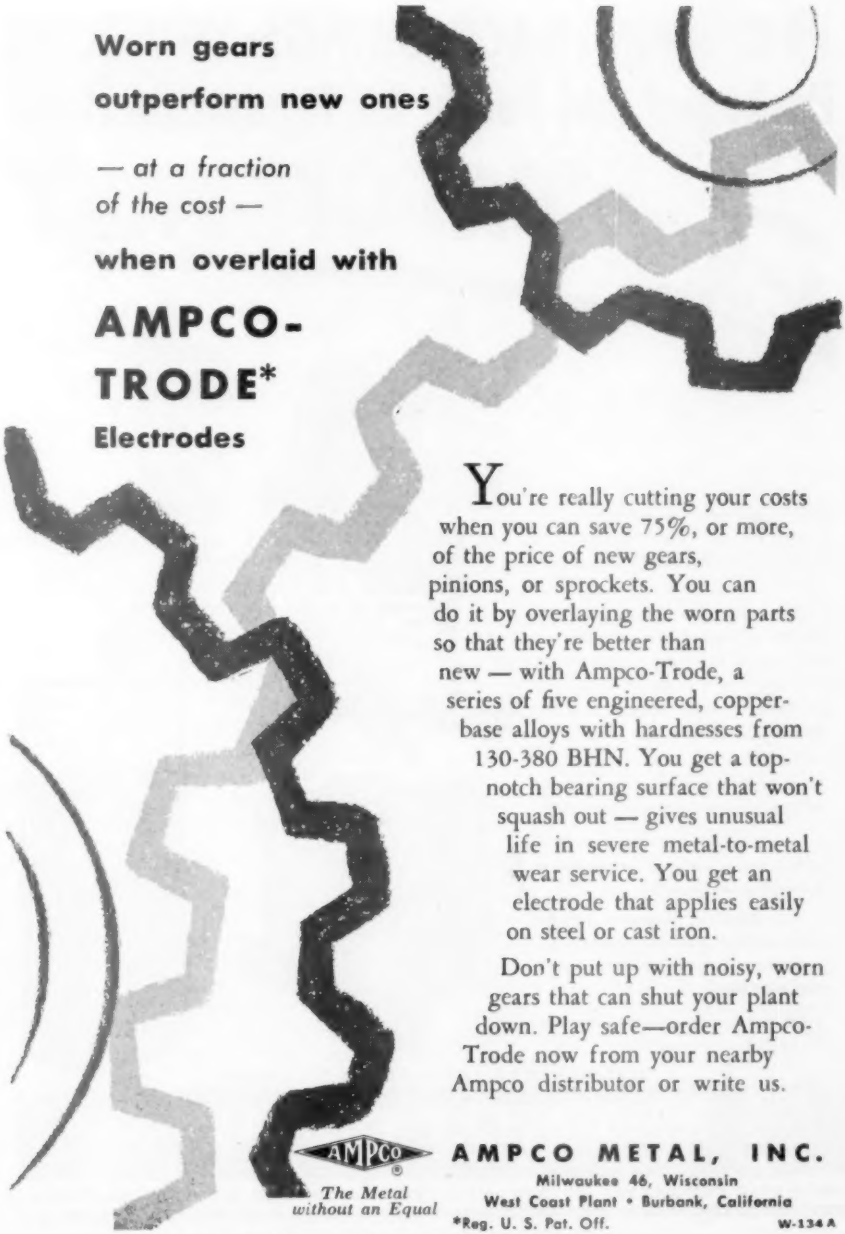
outperform new ones

— at a fraction of the cost —

when overlaid with

AMPCO-TRODE*

Electrodes



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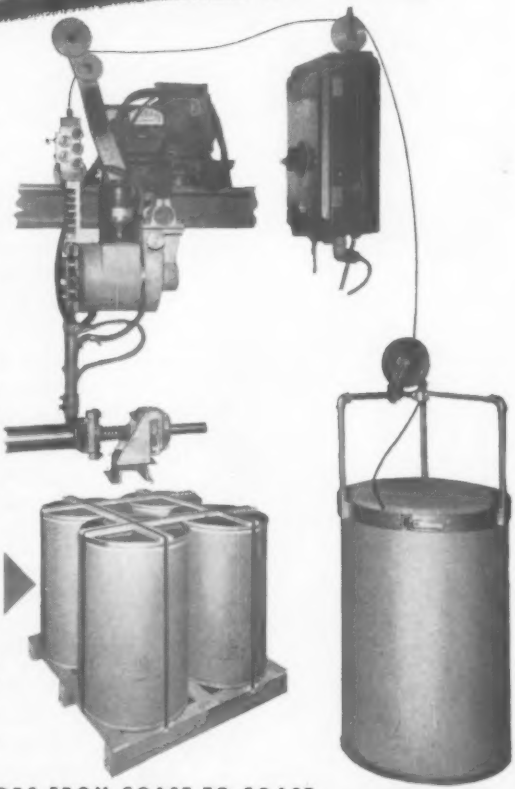

Now you can have steel wire in small diameters for welding with inert gas or CO_2, shipped ready for production use in 500 lb. package.

Each Raco "Pay-Off-Pak" consists of one continuous coil, *properly* coiled and cast to insure truly high production automatic welding for extended periods without interruption.

This wire is free from kinks, bends, twists, and crossed strands for positive wire feed at increased welding speeds. 500 lbs. of wire in one coil eliminates necessity of constantly changing and reloading of smaller coils.

Uniformity of wire is guaranteed throughout the entire coil by our quality controlled processing methods.

Four "Pay-Off-Paks" are shipped on a wooden pallet for convenience in handling and storage.

"Pay-Off-Pak" shipments can be furnished in all grades of carbon steel, low-alloy steel, stainless steel, and aluminum wire.

For further information, see your distributor or write us direct.

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The REID-AVERY COMPANY Inc.

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SINCE 1919 PRODUCERS OF ARC-WELDING ELECTRODES AND WELDING RODS

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sembly work or hardfacing applications such as building up tractor rolls. A wide range of work can be handled and different kinds of centering devices, locating rings, and automatic ejectors can be incorporated.

Internal chucking fixtures are used for turning large diameter work under a fixed head. Expanding chucks pneumatically operated can frequently be used. External type chucking fixture is not nearly so often encountered. Such a one would be for the butt welding of two lengths of heavy pipe, with the machine consisting of two heavy hydraulic chucks set side by side. The chucks rest on, and are turned by, driven rolls. A length of pipe is driven through the chucks and over a boom at the far end of the machine. Another length of pipe is fed into the near chuck. The work is then clamped up, rounded and aligned by the chucks. Back-up for the weld is provided by a copper shoe mounted at the end of the boom.

Longitudinal Positioning

Equipment for holding or moving the work and welding longitudinal seams falls broadly into four different classes: Travelling carriage often mounted on a track and incorporating turning rolls; long beam for carrying a travelling welding head; a stake-type fixture with an internal mandrel for securing the component to be fabricated; continuous automatic welding mill type of positioning equipment. The latter type is designed for the rapid production of pipe or tube of varying diameters. An example of such a plant is one which uses two submerged-arc welding heads and takes pipes of from 1 to 2 foot diameter with a maximum wall thickness of ½ inch. Speeds vary from 3.3 to 6.6 feet per minute. This type of plant does not normally come within the sphere of the general engineering shop.

Automatic Profile Welding

Automatic profile welding involves automatically welding of components along a determined outline according to a template. An effective method, used by one British fabricator, employs an automatic welding head mounted on a standard oxygen profile-cutting machine. The question of automatically welding irregularly shaped seams on a surface which is not flat has been achieved by synchronizing the position of the weldment with the equipment which carries and moves the welding head.

If an irregularly shaped component is revolved under a welding head in the vertical plane, two difficulties are encountered. First, the weldment must be rotated at varying speeds since the linear speed will vary as the distance from the center of rotation. Secondly, the irregular outline will entail the welding head travelling horizontally and being free to move vertically.

These problems were solved in the following way. The equipment was set up to weld strips and side plates to the shells in fabricating a large number of Scotch-type marine boilers. To ensure constant speed, the welding head was supported on a mechanized carriage. Angle-iron track was fitted and tacked to the surface of the shell. A trunnion mounting supported the entire boiler and provided rotation in the vertical plane. A

(Continued on page 118)

Combined use of new iron powder coated contact-type electrodes and semi-automatic submerged arc welding produce cleaner, smoother welds at much higher speeds.

Welding Time Cut in Half!

IN recent months, All-Purpose Spreader Co., (Blaw-Knox Equipment Div., Blaw-Knox Co.,) reduced welding time up to 50% on many sub-assembly and final assembly items by using new iron powder type electrodes; this brings about important cost savings, as welding of such equipment has substantially increased in late years, and now composes some 75% of total manufacturing time,

Contact-type electrode makes 21-inch long fillet weld in "cat" track twice as fast. Ease of slag removal minimizes weld cleaning problems.

Using small powered-positioner and a semi-automatic welder, operator joins flanges to tube. One-eighth inch coiled wire is used at 200 amps.

reported a company spokesman.

Better looking welds, and fewer imperfections in welding the rugged equipment have been noted. In addition, only about half the clean-up time formerly needed is now necessary. Slag is easier to remove, and spatter is practically eliminated.

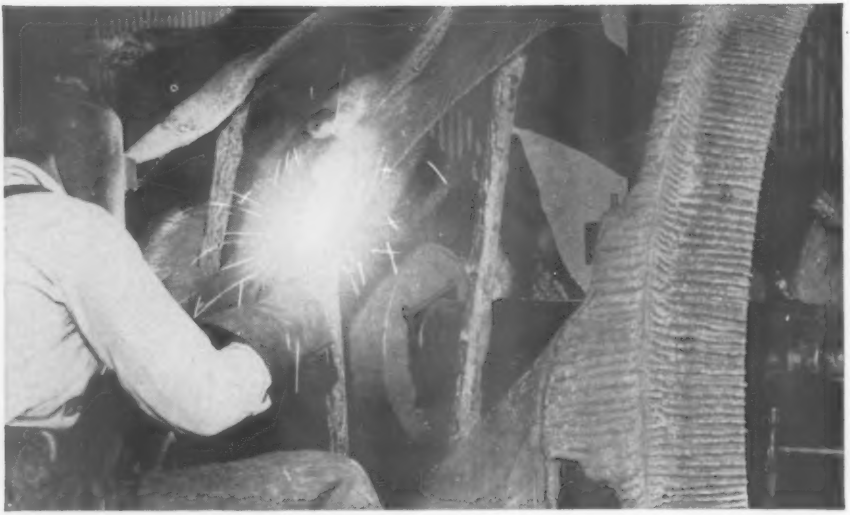
Base paver "cat" tracks were formerly welded at the rate of 40 to 50 per 9-hour shift; with the new type of electrodes 80 to 90 are now made in the same time. The tracks are T-weldments, of ¾ x 8 x 21" base plate, and ½ x 2 x 21" bar, mild steel. The 21-inch weld on the track is made with 18-inch rods.

A simple jig is used for the track welding. No surface preparation is required on most welding jobs with the new type electrodes. Those used range from ⅛" to $\frac{7}{32}$" on various jobs. AC welding machines are usually preferred. About 1750 pounds of electrodes are used monthly.

Better welding on a cut-down housing for the rear end of a base paver, for instance, is assured by the use of $\frac{5}{16}$-inch low hydrogen electrode. The electrode is preheated slightly by running a torch back and forth over it before starting to weld.

APSCO has also, for about two years, used semi-automatic welding on many sub-assemblies, substantially reducing circumferential welding time. This technique puts welding practically on an automatic basis, when manually or electrically powered positioners are used to rotate the work.

The company has found that the nature and size of its equipment and its weldments make possible final assembly right on the plant floor.



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AMERICAN MANGANESE STEEL DIVISION
Chicago Heights, Ill.

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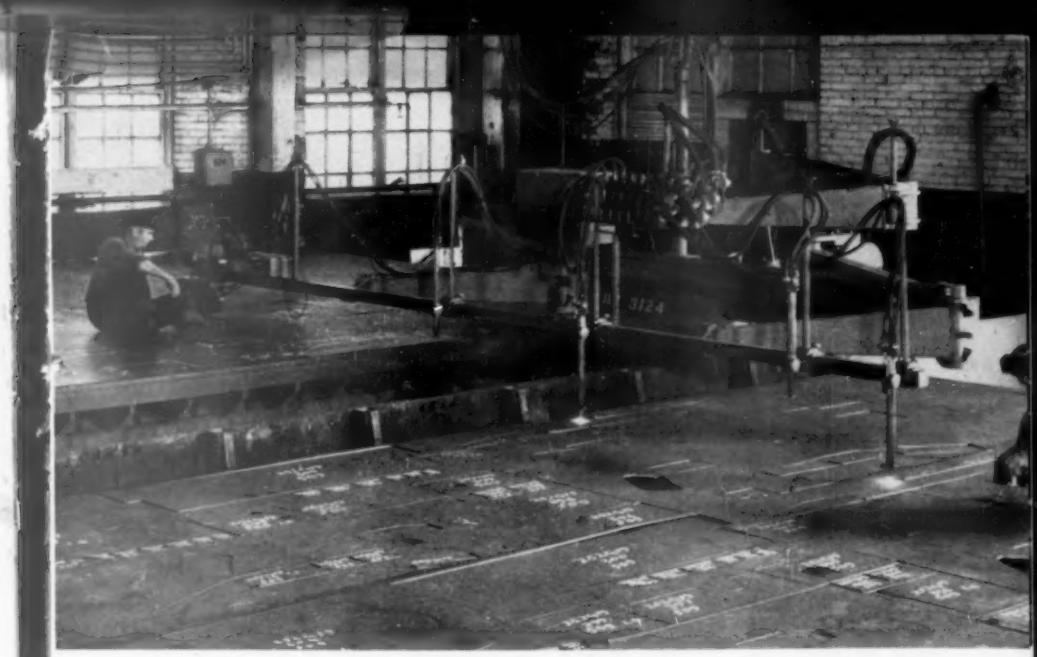


Electronic eye tracer follows line of demarcation between white and black areas of template. White links connect parts on template and make possible continuous cutting. Up to four torches can be used.

Use Multiple-Item Templates and Electronic Controls in Flame Cutting

SUPPOSE you had to cut an intricate shape from a piece of steel. Suppose the part had to be uniformly accurate with a smooth edge that would fit tightly against other parts of a weldment. How would you go about it?

A hacksaw certainly would be too slow and too costly. Torches cut steel quickly and smoothly, but they aren't too accurate—unless you work out a good control system for them.

Fire Teams with Electronics

At Marion Power Shovel Company, one of man's oldest servants —fire—has been teamed with one of the newest—electronics—in a process that cuts intricate shapes out of steel with no more difficulty than dress parts are cut out using paper patterns.

Hour after hour, electronically-controlled flame cutting machines —sometimes in pairs, or even in fours, cut complex weldment parts out of heavy steel plate. Some of these parts have more curves than a roller coaster, but it's a cinch to cut them out efficiently and accurately.

To begin with, a template — a sort of track on which a light beam will ride—is made for the various

Flame cutting makes possible mass production of weldment parts that are uniformly accurate, parts that fit precisely and smoothly, assuring maximum strength with minimum weld time.

Template is prepared by applying a pressure-sensitive tape to an outline of the weldment parts on a sheet of black Masonite board.

weldment parts to be cut from a specific steel plate. The template-making department, which is housed in a separate building, includes large tables for layout and walls of racks for storage of the many templates kept on file for ready use.

A sheet of black Masonite board having the same surface area as the matching steel plate is placed on one of the layout tables, and strips of ¼-inch wide white Scotch tape are pressed onto it to form an exact outline of the weldment parts.

Two Templates Classifications

There are two classifications of templates, both of which are full size.

The first group is single-item templates which carry the outline of only one part.

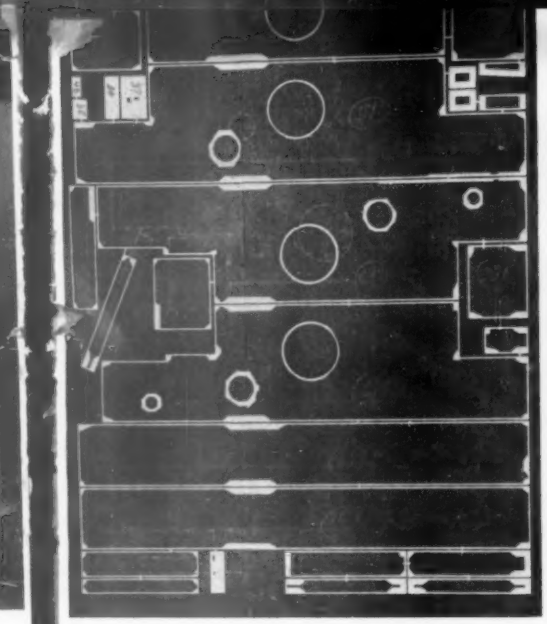
Second group is multiple-item templates on which items are interconnected by small strips of tape so the burning operation can be continuous. One of the chain-burning templates, for instance, carries 72 items, and it takes two torches more than eight hours of continuous burning to cut all of these pieces from a ½-inch thick steel plate.

Items of multiple type templates are arranged, or "nested," so as to make maximum use of standard widths of steel plate. This helps simplify steel purchases, reduces the area needed for steel storage and minimizes scrap. As design changes come along, the templates can easily be altered to incorporate them.

A specially-constructed monorail carrier hauls the big templates back and forth between the template-making department and the tracing table in the structural department.

How Cutting Is Done

Over in the structural department, the templates are laid on the tracing table, parallel to the steel plate, and a large arm positioned above them. An electronic "brain," which is crammed full of photoelectric tubes, sensitive lenses, a light source and wire "nerves,"



Multiple-item templates usually carry all parts for a particular weldment. In some cases this is as many as 72 different items.

File racks are used to store all templates for which there is a possible later use. Templates are transported on special monorail carrier.

hangs on the end of the arm above the template.

A beam of light from a bulb in this "brain," or scanning head, is focused on the outer edge of the template tape. The light is focused half on the white surface of the tape and half on the black Masonite surface. Intensity of the light reflected actuates a steering motor. In other words, when more of the light falls on a white surface than on a black surface (or the reverse) an electrical signal starts the steering motor and guides the light beam along the exact edge of the curves in the tape. This is a very precise measurement which keeps the torches right on the outline of the part regardless of the frequency and sharpness of the turns they make.

One, two, three or four oxy-acetylene torches, their supply hoses trailing back along the arm to the central supply, are suspended from the end of the arm which is above the steel plate.

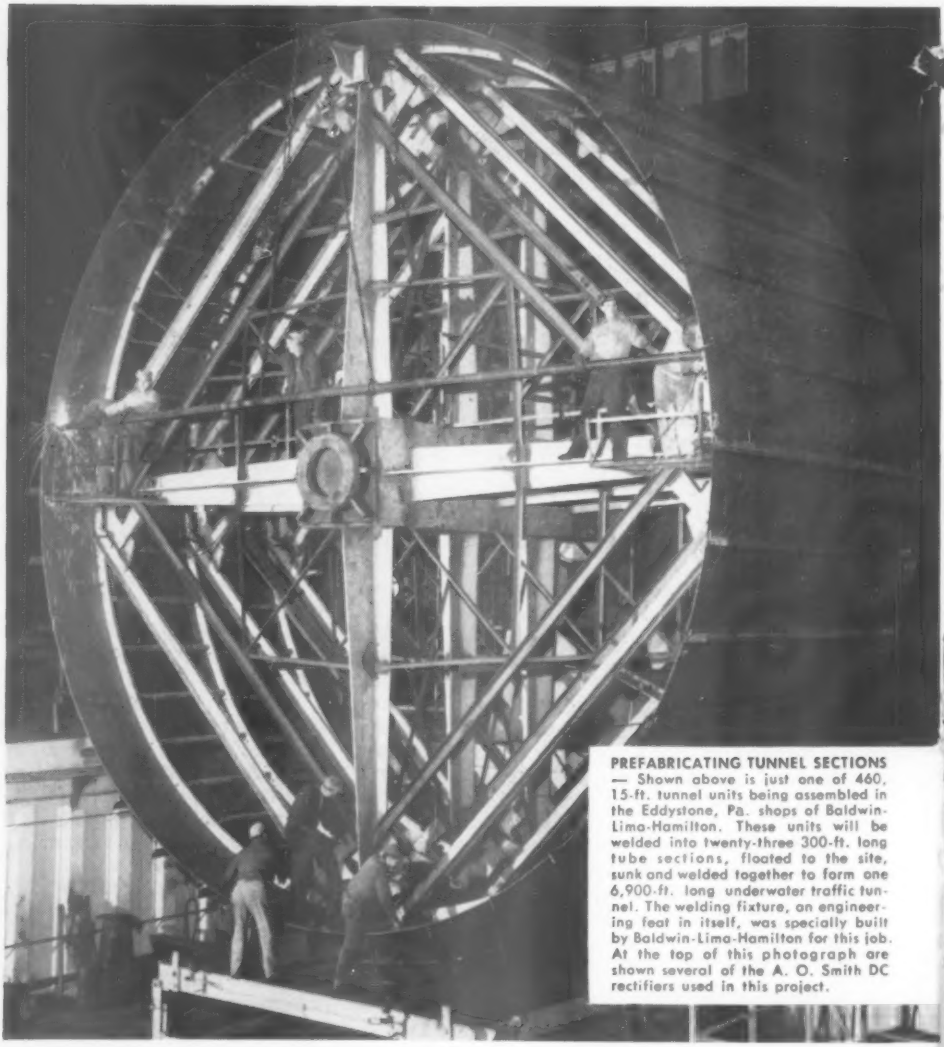
When the setup is complete, the operator starts the cut and sets the light beam for the start of its snake-like journey. Torches are lowered and lighted, a switch is thrown and the operation begins. Like a little bloodhound, the beam of light faithfully follows every twist and turn of white tape, guiding the torches around an exact path on the steel plate.

Minimum of Supervision

The human element hasn't been entirely eliminated, of course. Someone has to be around just in case this electronic wonder should get its signal mixed and start going around in circles that aren't on

(Continued on page 118)

HUGE UNDERWATE



PREFABRICATING TUNNEL SECTIONS — Shown above is just one of 460, 15-ft. tunnel units being assembled in the Eddystone, Pa. shops of Baldwin-Lima-Hamilton. These units will be welded into twenty-three 300-ft. long tube sections, floated to the site, sunk and welded together to form one 6,900-ft. long underwater traffic tunnel. The welding fixture, an engineering feat in itself, was specially built by Baldwin-Lima-Hamilton for this job. At the top of this photograph are shown several of the A. O. Smith DC rectifiers used in this project.

Circle No. 82 on Reader Service Card.

R TRAFFIC TUNNEL

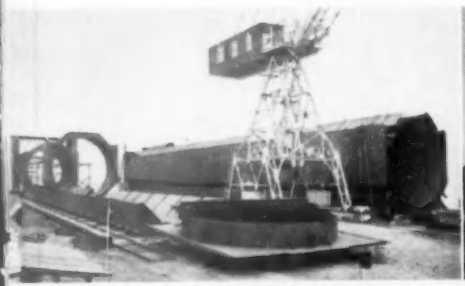
A. O. Smith electrodes used for over 910,000 ft. of welds. Baldwin-Lima-Hamilton tackles tough Hampton Roads tunnel contract . . . uses SW-10's, SW-15's, SW-44's, and SW-35's for the manual welds.

On a job this tough, Baldwin-Lima-Hamilton Corp., Philadelphia, Pa. knew there could be no margin for error. They specified A. O. Smith electrodes for the manual welding.

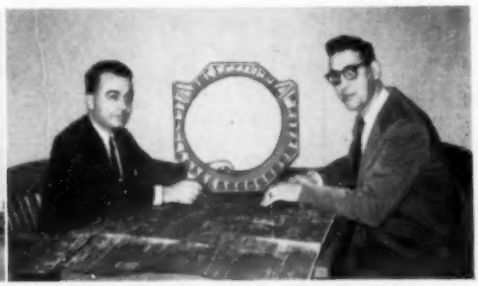
The work involved pre-fabricating 15-ft., double-shelled tunnel sections into huge 300-ft. sections. The larger sections have concrete poured between the shells, and bulkheads welded over the open ends. Twenty-three 300-ft. sections will be floated to the site and sunk in position to form the 6,900-ft. underwater tunnel.

More than 215,000 lbs. of A. O. Smith electrodes will be used. Specifically—over 45,000 lbs. of SW-10 (E-6010) . . . 30,000 lbs. of SW-35 (E-6020) . . . 95,000 lbs. of iron powder SW-44 (E-6024) . . . and 45,000 lbs. of SW-15 (E-6013).

If your job demands top quality welds every time, talk to your A. O. Smith representative. Or — write direct to A. O. Smith Corporation, Welding Products Division, Milwaukee 1, Wisconsin.



At left side of photo, complete 15-ft. sections, with concrete already poured between inner and outer shell, rest in shipway. There they will be welded into large 300-ft. sections as shown on the right.



Frank Iapalucci, Baldwin-Lima-Hamilton's director of welding, and Dave Buerkel, A. O. Smith welding representative, compare scale model section with blueprints. Over 215,000 lbs. of A. O. Smith electrodes will be used.

PRODUCED BY WELDERS—FOR WELDERS
Because welding is our full-time business, we can offer you America's finest welder-proved electrodes, machines and accessories.

Through research . . . *a better way*

A.O.Smith
CORPORATION
WELDING PRODUCTS DIVISION
Milwaukee 1, Wisconsin

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A plant-wide analysis of compressed air facilities showed Ryan Aeronautical Co. how to obtain maximum efficiency from more than 4000 air-operated tools.

USING COMPRESSED AIR EFFECTIVELY

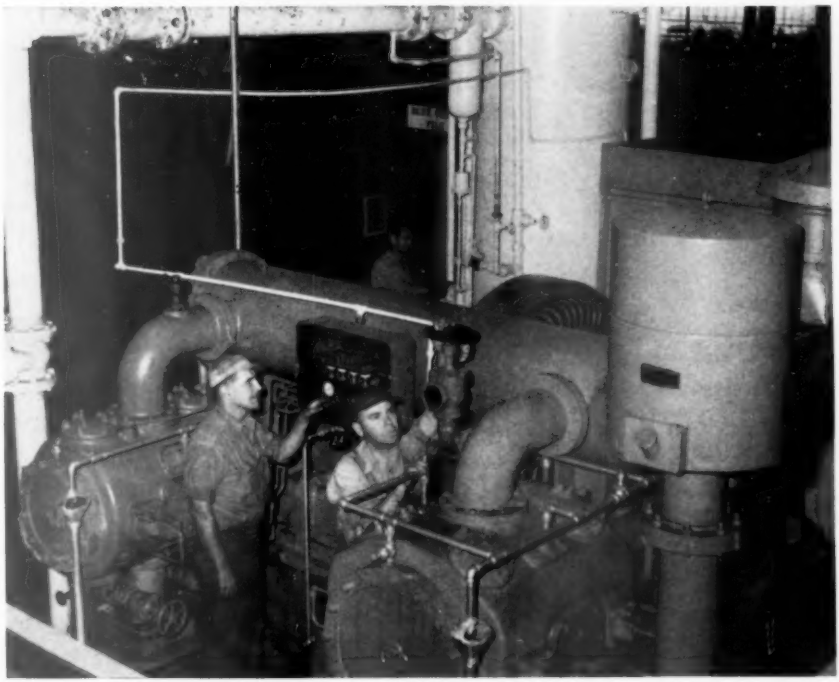
by **JOHN ROUSH, Methods Engineer, Ryan Aeronautical Co.**

BENEFITS of $20,000 a month can accrue from a compressed air program launched not long ago at Ryan. Developed from an extensive survey, the new program outlines the method for obtaining maximum efficiency from air-operated tools, with minimum maintenance. Tests show that these substantial savings may be realized with increased production and reduced operating costs.

Because it is a silent, unseen source of power, compressed air is too often taken for granted. Yet it is a potent production force which deserves expert analysis. For instance, at Ryan 680 horsepower is required to obtain the compressed air used by air-powered tools. These include 4,000 hand-operated drilling, riveting and grinding tools as well as Ryan's 95 resistance welding machines, huge Cecostamp air hammers and pressure test stations.

Economically, too, the use of compressed air at Ryan involves

One of four compressor stations in Ryan plant, this unit provides 3600 cubic feet of air a minute at 100 pounds per square inch pressure.



substantial amounts. More than $2,000,000 a year in wages is paid to just those employees using air-operated tools. In addition, an amount of $82,600 yearly is expended for parts and labor required to keep Ryan's $300,000 worth of air hand tools in good operating condition.

Due to this growing importance, it was deemed advisable to undertake a detailed analysis of compressed air operations. Started several months ago, by the methods engineering department, this study has been completed and the recommendations made are now being carried out.

Our survey disclosed some interesting things with respect to the tools, distribution lines and sources employed in the compressed air activity.

Study First Made of Pneumatic Tools

The cost of rehabilitating a tool which has broken down because of defective lubrication may well run between $50 and $75. It was shown by the survey that expensive tool repairs could be avoided in almost every instance if a system were adopted which insured the regular lubrication and testing of each tool. Testing is important because frequently a tool will become faulty

BEFORE. Unnecessarily long air hose had to be coiled to be used. Both hose length and coiling reduce air power. Hose becomes a water trap because it is taken from bottom of the feed pipe.

AFTER. Because length of air hose has been reduced, operator has a more powerful pneumatic drill at his disposal. Hose is now taken from the top side of the feed pipe.

but its defection will not be apparent to the user. Consequently, he will continue to use it, causing further wear or damage and resulting in loss of production time because the tool is not putting out at its rated capacity.

In order to accomplish the lubrication and testing of tools without discommoding production, an ingenious mobile test cart was devised. Equipped with test instruments and oiling devices, these carts travel through the factory to bring the analytical facilities to the tools in use.

Establish Maintenance Program

Every air-operated tool is tested each week. First, the tool is checked on the test cart's tachometer to determine its RPM. Then, a flow meter check is made to analyze its capacity to handle cubic feet of air per minute. By harnessing the tool to a hydraulic pump which pumps oil against a pressure gauge, a good idea of the power which the tool develops is obtained. Finally, the tool is oiled. If defects show up in the tests, the tool is sent to the repair station for repairs.

Study Distributing Lines

Ryan factory buildings, covering over 750,000 square feet of space, are adequately served with compressed air. The desired objective is to see that a full 90 pounds per square inch pressure is brought to each hand tool. Tool manufacturers have standardized their equipment on this air pressure. They state that a tool will lose power if air pressure drops below 80 psi and that undue wear will ensue if pressure goes above 110 psi. Power loss can materially affect production output. For instance, Ryan found that a typical tool could produce 18 parts at 90 psi but only 14

(Continued on page 75)

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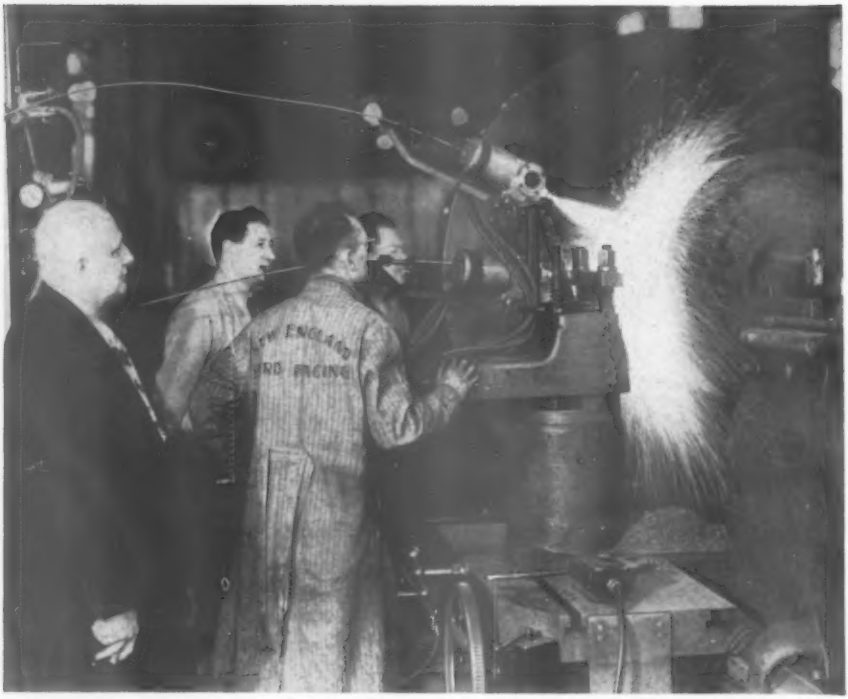

Photo courtesy New England Hard Facing Co.

build up smoother, more uniform surfaces with CRUCIBLE metalizing CORE WIRE . . .

For consistent uniform spray . . . quick build-up and smooth, sound deposit, you can depend on Crucible *stainless steel* metalizing core wire. For, like all of Crucible steels, it's *prescription-made* for the job. And it's backed by over a half century of *special purpose* steel-making experience.

Crucible metalizing wire is made in a wide variety of stainless steel grades for corrosion-, abrasion- and heat-resisting applications. There's a grade for every need. Next time you require metalizing wire, call your nearby Crucible warehouse. And for your free copy of our new booklet on *Rezistal* stainless steel wire, write *Crucible Steel Company of America, Henry W. Oliver Building, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

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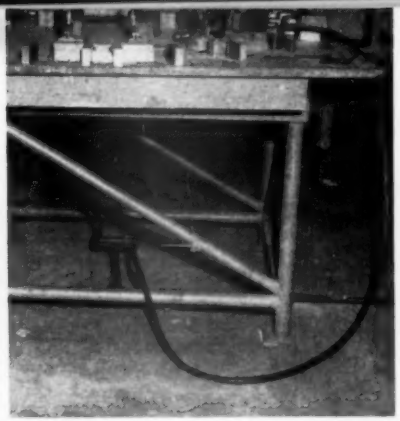
BEFORE. Excessively long air hoses are also floor hazards and reduce tool power because of the extra friction induced due to length and coiling.



AFTER. This correction of poor installation results in substantial cut in power losses, increased ease in handling tools and reduction in floor hazards.

when air pressure dropped to 70 psi.

Good Fittings Are Important

One of the most revealing aspects of the Ryan survey were the pronounced effects which fittings and hoses had upon tool performance. Ryan uses 3,000 quick-disconnect type fittings. These should be inspected at regular intervals. After months of service, the rubber washers and metal valves in them can become worn, greatly restrict air passage and result in very inefficient tool operation.

By specifying the best type of fittings, these losses can be held to a minimum. The pressure drop through a good quick-disconnect fitting and valve is only 3 psi or 5 percent in tool efficiency.

Size and Length of Hose?

A number of instances of power loss due to improper size and length of hose used were uncovered by the study. The smallest inside diameter rubber hose recommended by air tool manufacturers is $\frac{1}{16}$". Often ¼" hose sizes are used and no consideration is given to lengths employed. Tests proved that as much as 1 psi per foot of hose is lost when diameters are slightly undersize. In some cases it was found that 25 feet of hose were used to serve a work station only 6 feet from the air outlet. A gain of 2 psi was made by merely uncoiling such hose.

A typical situation which can occur is one in which a ¼" hose from an air outlet is plugged to a hose of larger diameter which, in turn, is connected to two or more whip hoses for tools. Here, the capacity of every tool is limited by the first undersized hose and further reduced by the lengths and multiple fittings used. In such a case, tool efficiency was increased 42 percent by merely removing the first hose. By substituting ⅜" diameter hose for ¼", in one particular instance, the tool efficiency was increased approximately 180 per cent.

Basically, Ryan's main compressed air lines were found to be adequate but branch lines were sometimes improperly arranged. For instance, it was found that ¾" diameter overhead plug strips

Why Nick sat this one out

As soon as they start playin' tango music at the party, Goldie is on her feet.

'C'mon, Nick, it takes two to tango...'

I've about decided I'm trapped when my friend Jack all of a sudden comes alive. 'Two to . . . say, Nick, that reminds me. A friend of mine just finished a welding job down South . . .'

'I give up. Welding,' says Goldie and off she goes to corner the guy with the moustache down at the other end of the table.

'This job took two kinds of electrodes, Nick, the "132" Inconel* and the "142"* 80/20 Nickel-Chromium.

'This was a big job on an Inconel-Clad digester – for a paper mill – two shell sections and a dished head. It took 600 lbs. of electrodes.

'Well, after my pal finished welding the steel backing, he back-chipped on the clad side to get to clean, sound weld metal. Then he laid in the first pass with "142" electrodes.

'Well,' Jack continued, 'this friend of mine was smart and laid the second and third pass with "132" electrodes, instead. Saved himself a smart piece of change.'

A gleam came into Jack's eye and I knew the old needle was coming. 'I guess you won't be wanting word of

Circle No. 50 on Reader Service Card.

this to be getting around, Nick, so if you'll buy the next round . . .'

I asked him how thick was the plate.

'It was 1¼-inch plate. 10%-clad.'

'Nothing wrong with that then,' I said. 'It's a smart trick and will work on any Inconel cladding that's 3/32-inch or thicker.

'The "142" electrode is really a souped up "132". It's got more chromium and practically no iron so it can stand more dilution from the steel than the "132". In fact, on clad it gives a weld deposit that practically matches the Inconel alloy itself. After the first pass your friend was just about welding Inconel to itself. So of course he could use "132" electrodes.'

Jack looks like he's won the daily double and can't find the ticket. But he hasn't caught me yet on welding procedures for clad or solid alloys. And if you don't want to get caught when it comes to welding solid Inco Nickel Alloys, better drop me a card for the latest edition of our welding bulletin, T-2.

*Registered trademark

Yours for better welds,

Nick Rodder

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street, New York 5, N. Y.

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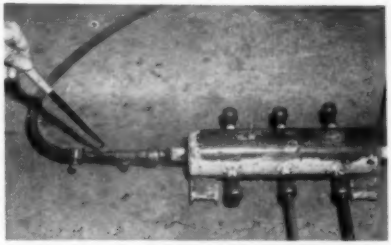
COMPRESSED AIR . . .

(Continued from page 75)

were fed by ¼" branch lines. In one case a greatly extended branch line was feeding 34 outlets even though another source of air was close at hand. A common practice was to take the tool outlet from the bottom of the feed pipe, tending to make a water trap out of the outlet.

Ryan uses a good many manifolds, or "pigs" which consist of a short length of 3-inch diameter pipe with a main inlet in one end plate and a drain cock in the other.



This ¼-inch air line unduly restricts power supplied to six-outlet "pig." Note that drain cock, at extreme right, has been replaced by a plug which prevents draining of the component.

Six fittings are installed in the barrel to serve tools. Tests showed that these "pigs" could function efficiently when connected to branch lines through ¾" hose and ½" pipe fittings. Without proper supervision, these units are often converted so that they do not meet these requirements. Sometimes, the drain cocks are removed and a plug or another air fitting is inserted in its place, so that they cannot be drained.

Tapered Valves Eliminated

As a direct result of the study,

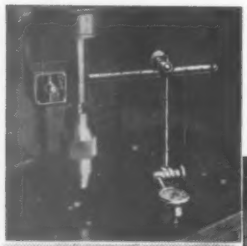
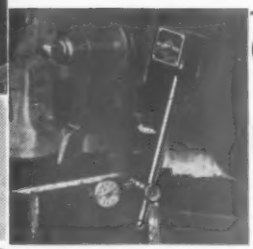
(Turn to page 78)

Ryan has standardized on the use of Hansen fittings and ⅜" diameter hose lines of the shortest possible run to each work station. All fittings are inspected at regular periods and worn valves and washers replaced. Tapered valves have been replaced with square shoulder valves which permit an average of 14 percent more air to pass. Care is taken to see that not more than 10 Hansen fittings serve a ½" pipe inlet and hook-ups are distributed in as balanced a manner as possible. "Pigs" are served with proper sized hose and fittings and drain cocks were reinstalled.

These steps have increased tool power as much as 200 percent and have made more compressed air available to the plant. This may sound paradoxical in view of the fact that larger air lines require more air to keep them supplied. As a matter of fact methods engineers estimate that it takes 35 percent more compressed air to fill the system now because of the enlarged hoses and fittings. However, with full power at each tool, the production jobs are accomplished in a fraction of the time formerly needed with the result that more air power is available to the plant.

Compressed Air Sources Improved

Four compressor stations are located in the Ryan plant to provide the necessary compressed air. Five Gardner-Denver compressors and one Worthington type are used to develop 3600 cubic feet of air a minute at 100 psi. The survey showed that this air entered the main lines of the plant at a tem-

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perature of 100°F. As it coursed through the plant and into the hand tools, it cooled and moisture in the air condensed within the system. This water caused rust which flaked off and was blown into the tools. The moist, dirty air entering the tools removed the lubricants and introduced foreign abrasive matter which contributed to excessive maintenance costs.

By improving the design and use of water trapping facilities, Ryan improved this undesirable condition. However, the survey recommended that steps be taken to remove the water from the air before it entered the distributing system. This has been done at one compressor station and is being planned for the others. A Parkhill-Wade air drier has been installed to remove the water content from the air. By means of a triethylene glycol solution, through which the compressed air is flushed, two-and-a-half gallons of water per hour are being removed from the air.

K-G Appoints Six New Distributors

K-G Equipment Co., Inc., Allentown, Pa., manufacturers of oxy-acetylene welding and cutting equipment and oxygen therapy equipment, has appointed the following distributors: Gordon's Welding Supply Co., Glen Falls, N. Y.; Joseph Hurwitz, Butler, Penna.; Temple Iron & Metal Co., Temple, Texas; Travis Welding Supply Co., Dallas, Texas; Welding Sales Co., Orange, Conn.; and W. P. & R. S. Mars Co., Duluth, Minn.

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avoid scrap loss, reworks with DryRod Electrode Oven!

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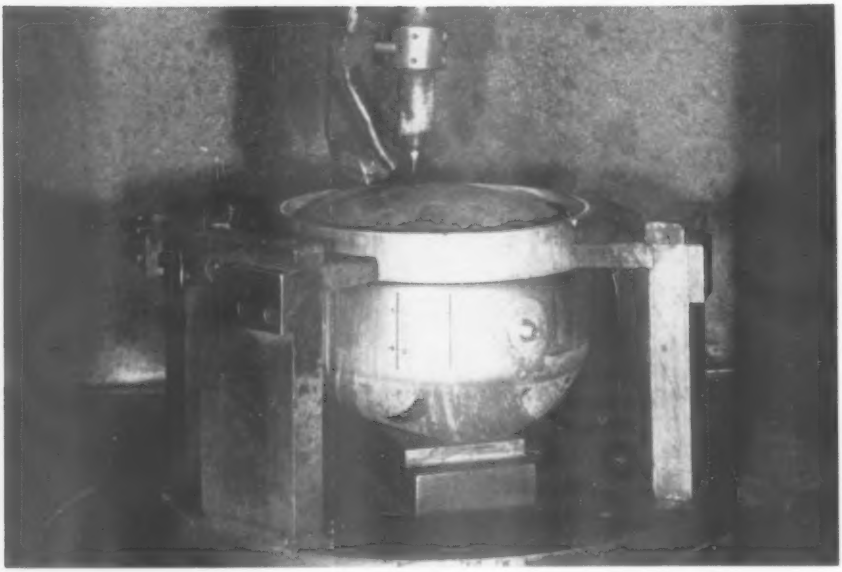


CO_2 shielding gas protects welds made in compressor shells by automatic inert arc process. Copper tubing directs shielding gas flow. Gas shield nozzle was discarded because spatter accumulated on it and fell onto welding areas.

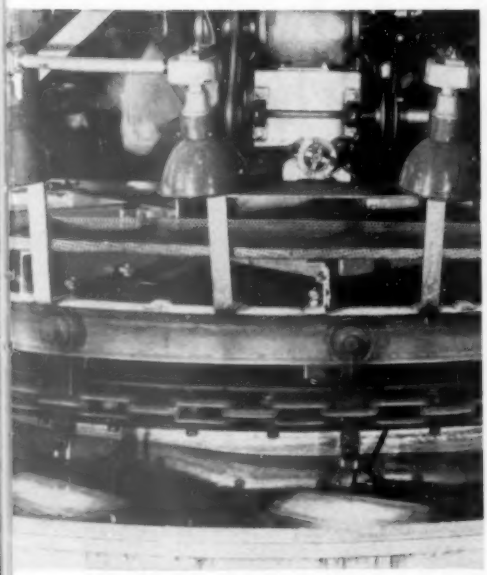
How to SPEED Production

ACTUAL production welding, using carbon dioxide gas as a shield, has gained prominence within the past few months. One of the first to recognize the advantages of the inert gas-shielded arc process, coupled with the use of carbon dioxide as a shield, was the Kelvinator Division of The American Motors Corp., Detroit, Michigan.

Economies Are Obvious

This company, quick to realize the economies of the process, installed a trial setup to weld refrigerator compressor shells. In the manufacture of this product, great pains are taken to maintain dirt free assembly rooms. All foreign matter must be eliminated before the unit can be assembled. Each shell is vacuum cleaned before the lid is placed in position for welding. Any foreign matter such as dust, dirt, lint or fluxes would seriously impair the service life of the unit.

Until the inert gas-shielded process was introduced, extra care had to be taken in the welding room to maintain this high quality. Here, the lid was welded in place using



Thorough underwater testing at 250 psi checks welds. Leaks, which had run as high as 10 percent, were eliminated.

with CO_2 Welding

the submerged arc process. A disadvantage with this process, which is not present with the inert arc process, is the possibility of flux entering the shell.

Spatter Is Major Problem

After fixturing and timing problems were solved, equipment was moved to the production area. It immediately became apparent that the major problem would be spatter, inherent in this process where carbon dioxide is used as the shielding gas. Splatter accumulating on the gas nozzle, and then dropping onto the welded joint ahead of the arc often resulted in a leak at that point.

Eliminate Spatter Problem

With carbon dioxide as a shield, splatter cannot be eliminated entirely because of the unstable arc, but it can be controlled. By using proper technique, that is, a short arc length, it was possible to reduce splatter considerably. Even with the short arc, fine splatter continued to build up on the gas-shield nozzle during the welding of several shells. Eventually the accumulation of splatter dropped onto the joint. The arc passing over the splatter failed to fuse it into the joint, and a leak would result.

Replace Gas Nozzle

This problem was eliminated by removing the gas nozzle on which the splatter accumulated. In its place a copper tube was used to bring the shielding gas to the arc. The high heat conductivity of copper tends to reduce adherence of the splatter. Where leaks were running 10 percent because of accumulation of splatter on the gas nozzle, they were eliminated entirely.

Apparatus includes a 900 amp constant voltage welder with a special head and panel. Rate of $\frac{3}{32}$-inch high silicon wire feed is 12½ feet per minute. Rate of CO_2 flow is 35 cubic feet per hour. The job is run at 600 amps, 25 volts, 75 inches per minute travel.

Photos and data courtesy Hobart Bros. Co.

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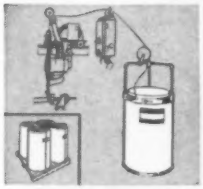
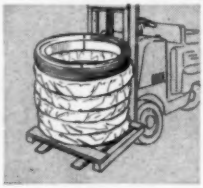
• The PAGE Automatic Welding wire packaging program was developed out of long experience and careful study of users' needs. These fine wires are packaged in a variety of ways for the most complete protection and the utmost convenience in handling and in stocking.



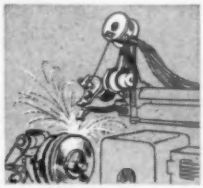
LEVERPAKS and PAY-OFF-PAKS

Lightweight and durable, Leverpaks and Pay-off-paks protect against coil distortion or wire corrosion. Compact, easily opened and resealed, roll and stack easily, take little floor space.



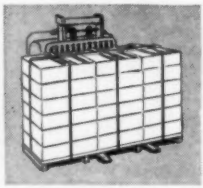
WRAPPED COILS

PAGE also offers single and pallet-mounted (1,000 lb., 2,000 lb. and 3,000 lb.) coils, each coil being wrapped in waterproofed paper and secured by steel strapping.



HANDY REELS

PAGE Inert Gas Welding Wire is available on reels: Precision thread-wound on twenty-five-pound, non-returnable reels to fit all popular inert gas welding machines.



COILS IN CARTONS

One of the most popular of PAGE packages: Coils in individual cardboard cartons, available either singly or palletized for easy handling by fork-lift truck.

Advantage No. 3

You buy from local stocks— and so you need only a minimum inventory

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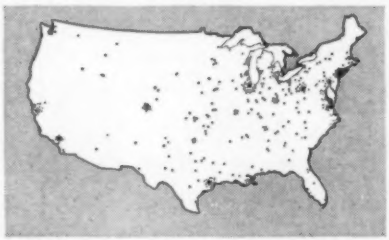
PAGE Distributors carry ample stocks from which your requirements can be filled without delay or inconvenience to you. This handy service not only saves you time in getting what you need, but makes it unnecessary for you to make a sizeable investment in inventory. Thus, your nearby PAGE Distributor is able to make double savings for you—a saving in time and a saving in actual dollars.



Get the full Analysis List

All the 26 analyses of PAGE Automatic Welding Wire are set forth in complete detail in new Folder **DH-402.** A free copy of this informative folder will be sent on request. Write our Monessen, Pa., office.

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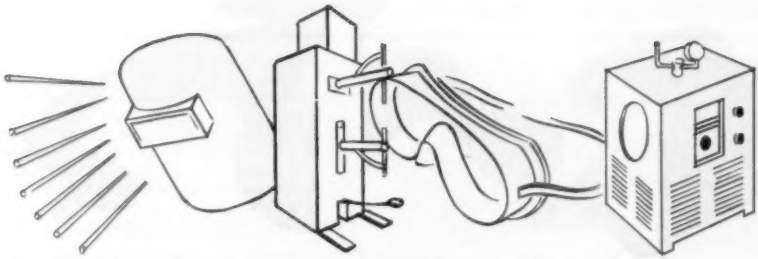
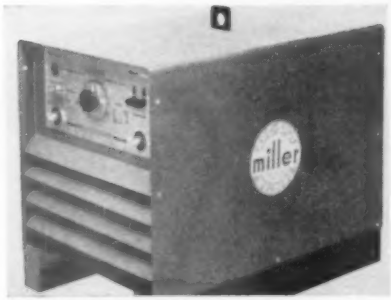


NEW PRODUCTS



New Welder Design

A newly designed DC rectifier-type welder, which is horizontal, rather than upright in design, has been introduced by Miller Electric Mfg. Co., Inc. The welders, called the SRH Series, were developed to conserve floor space and to facilitate stacking and paralleling.

The SRH welders have a single current range and are available in three models with 60 percent duty cycle ratings of 200, 300 and 400 amps. Weatherproof case makes it ideal for outdoor use.

Circle No. 150 on Reader Service Card.

Improved Measuring Tapes

Major improvements are now available in the Star Chief line of white steel measuring tapes marketed by Carlson & Sullivan, Inc. New features include jet black stud markings on every 16-inch center the full length of the ⅜-inch tape for convenience in laying out studs, tempered tool steel end-hook and nail-hole at exact zero for accurate surface measuring.

Tapes also feature a "take-apart" case for quick opening for cleaning or tape replacement, non-jamming, anti-backlash mechanism and sturdy chrome-plated die cast case.

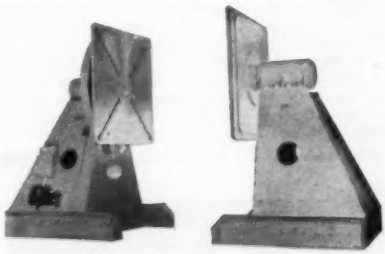
Circle No. 151 on Reader Service Card.

Use Reader Service Card for additional information on the products appearing on this and the following pages, mark the key number of the item on the card bound into this issue. Drop the card in the mail—no postage is required.

Head and Tail Stock Units

A new line of head and tail stock positioners has been introduced by Reed Equipment Div., Webb Corp. Normally built in pairs, positioners consist of a constant speed motor-driven head stock and an idling-type tail stock. They are now available in sizes ranging from 5,000 lbs. to 32,000 lbs. capacity.

Power to motor-driven head stock is through integral-type motor-reducer direct to pinion and final drive gear. All gearing is cut-tooth steel gears and all primary gear reduction operates in fully-enclosed oil bath. Motor is equipped as standard with built-in magnetic brake which instantly stops rotation when control switch is released.



HEAD & TAIL STOCK POSITIONERS

Circle No. 152 on Reader Service Card.

Gold Lenses for Inspection

Interchangeable, gold, methyl methacrylate lenses, recommended for inspection wear, are now available in Watchemoket Optical Company's "featherlight" Tuc-Away safety spectacle frames. Under close overhead lights, gold lenses are said to reduce eye fatigue and eye strain by softening glare and absorbing almost all harmful ultraviolet rays. At the same time, lenses make objects clearer by improving contrast between black and white.

Lenses are optically perfect, made of .080-inch thick shatterproof methacrylate. They are said to resist damage from most chemicals and welding and grinding sparks.

Circle No. 153 on Reader Service Card.

Flat-Type Welding Ring

A new flat-type welding ring with ⅛-inch diameter spacer pins has been introduced by Tube Turns, a division of National Cylinder Gas Co. Developed to improve submerged arc welding of pipe and fittings, ring is suitable for many manual welding applications, is said to enable joints to consistently pass X-ray and Gamma ray inspection and to meet all safety code requirements.

Small spacer pins are said to automatically and unfailingly center rings in the joint, prevent them from shifting up or down stream and eliminate the necessity for tacking rings to inside of pipe.

Circle No. 154 on Reader Service Card.

USE THE READER SERVICE CARD FOR VALUABLE REFERENCE DATA

New Eye Glass Cleaner

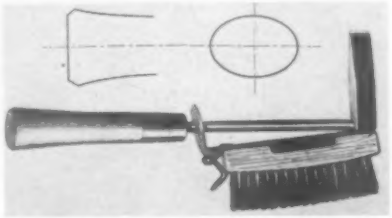
A new eye glass cleaner which banishes streaking and smudging has been introduced by Federal Research Industries. A clear, odorless compound, which is said to be ideal for use on welding helmet lenses, goggles and face shields, cleaner is available in a handy, wick-type dauber in a screw-top container.

By making a simple "X" mark with the Lens-Wick dauber on the surface of a lens or any glassware and rubbing gently with a polishing motion, one can prevent streaking and almost completely eliminate fogging, soiling and scratching. Glass treated with the cleaner will also repel water.

Circle No. 155 on Reader Service Card.

New Wooden Tool Grip

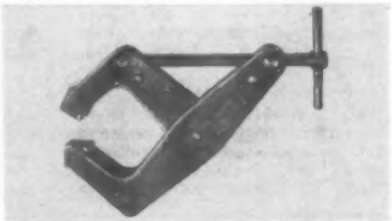
A new wood grip is now being furnished on their wood grip, steel shafted weld cleaning tools by Atlas Welding Accessories Co. The grip is egg-shaped to fit the hand naturally and line up chipping edge. It is belled slightly toward the end to prevent tool slipping out of the hand. Handles are made from No. 1 "Ozark" Hickory with wax finish. Metal coil handles continue to be available on all 27 Atlas Models.



Circle No. 156 on Reader Service Card.

Addition to Clamp Line

A new one-inch Kant-Twist clamp for small precision work has been put on the market by Saxton Mfg. Co. This clamp, like larger ones in the company's line, combines best features of "C" and parallel clamps. The side plates are made of high tensile steel. Each jaw is grooved for gripping rounds. Jaws rotate in one plane.



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(Turn to page 88)

in *Shipbuilding* — as in other great industries

MILLER WELDERS *are preferred*

Miller Selenium Rectifier type D.C. Arc Welders are available in four wide range models. For complete information on these and other Miller arc and spot welders, contact us today at no obligation, of course.

ARC ⚡ SPOT miller GENERATORS WELDERS

St. Louis Shipbuilding and Steel Co., largest builders of inland towboats in the world, require welds that will withstand a maximum amount of abuse.

Look anywhere in St. Louis Shipbuilding's mammoth yard and you will see Miller Selenium Rectifier type D.C. arc welders—in single units or in batteries of four and five for greater output.

For dependable welds, St. Louis Shipbuilding prefers the Miller S.R. welder. Miller is glad to be aboard.

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SOLD BY WELDING SUPPLY DEALERS

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Hand-Operated Metal Worker

A new, manually-operated metal worker that will bend, punch and shear flat and angle metal bars up to 3/16-inch thick and 2-inches wide in flat bars has been introduced by Diesel Power, Inc. Designed primarily for metal fabricating operations, Wielands Metal Worker stands 30-inches high, ex-

clusive of handle. It is 6½-inches deep and 6-inches wide. Weighing 170 pounds, it can easily be mounted on a wall or attached to a frame or sidewall of a truck. Pump handle linkage produces a thrust of 250 psi and simultaneously operates the bender, bar and angle bar shear and punch mechanisms. Dies of tool steel, in sets, come with machine.

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USE THE READER SERVICE CARD FOR VALUABLE REFERENCE DATA

Ball-Point Marking Tube

A fast-drying permanent marking ink in a handy package-applicator is offered by John P. Nissen, Jr., Co. Marking ink will not readily chip, peel or be affected

by heat or weathering and is packaged in a burst-proof tube fitting with a smooth-acting ball point. Implement can be used on rough or smooth metal, glass, wood or plastic surfaces. Different size ball points and seven standard colors are available.

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(More New Products on page 90)

Users of

Resistance Welding

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NEW Big Book

Here, at last, is a catalog designed for a busy man to use—good, clear illustrations with contours and dimensions plainly shown—well-organized listings with prices right alongside the specifications.

Nearly 700 resistance welding electrodes are listed for almost any welding job. The catalog also lists water-cooled holders of every style and size, seam welding wheels, alloy rod and bar stock.

If you do resistance welding, you need this book. Write for your free copy today.

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Division of Fansteel Metallurgical Corporation

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FOR SOLVING FLAME CUTTING PROBLEMS

Small or large—OHMSTEDE's time and labor saving equipment provides faster, easier cutting at lower costs.

Here are 8 big reasons why OHMSTEDE is your best buy.

- Unlimited variety of shapes
- Wide cutting range—cuts 42" dia. circle and straight line of 89"
- Spindle and automatic magnetic tracing
- Operates on either alternating or direct current
- Delivered with base—no extras required
- Sealed ball bearing construction
- Enclosed motor
- Low initial cost—high efficiency

OHMSTEDE flame cutting machines are the end-result of many years of development. Ruggedly constructed, they give trouble-free service and unexcelled performance under all conditions of use.

Write for complete details.

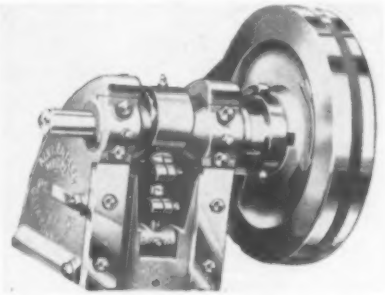
Ohmstede
MACHINE WORKS
897-899 N. MAIN ST. • BEAUMONT, TEXAS

Circle No. 71 on Reader Service Card.

Two-Ton Half-Press

The new Model B-2-A two ton half-press made by Alva Allen Industries can be adapted for any punching, shearing, forming riveting, blanking, cutting or drawing operation within its rated capacity.

As a half-press unit, press can be mounted on users own column and



base, which leaves desired working space that makes it possible to perform operations which would ordinarily require a much larger press due to working space involved.

Standard stroke is ¾-inch with ¼ to 1½-inch strokes available at an additional charge. Weight is 75 lbs. V-belt drive, requires only 1/3 hp motor.

Circle No. 160 on Reader Service Card.

Two Special Silver Alloys

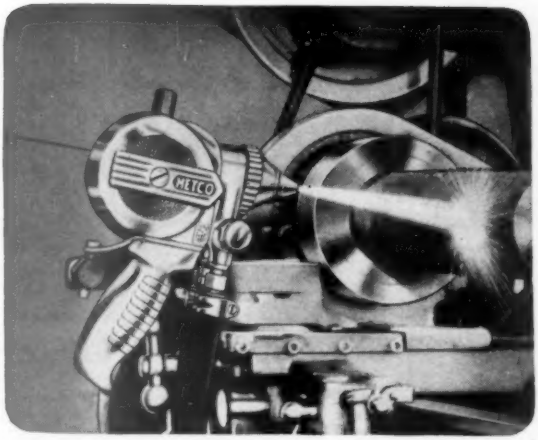
Designed for assembly of dissimilar ferrous and non-ferrous metals, two special silver alloys have been introduced by All-State Welding Alloys Co., Inc. Both of the new products are compounded for use with any heating method generally applicable in soldering. Melt and flow points are in the medium temperature range falling between soft solders and low temperature brazing alloys.

The first alloy is called No. 105 Medium Temperature Solder. It has a shear strength of 18,000 psi, melts at 675°F and flows freely at 750°F. The second alloy, No. 107 General Purpose Silver Solder, melts at 450°F and flows freely at 600°F. It has up to 20,000 psi shear strength, and excellent corrosion resistance.

The alloys are recommended for lap, sleeve and socket-type joints. Each requires a special flux; flux residue should be washed off with warm water. Wire diameters are 1/16, 3/32 and ⅛-inch.

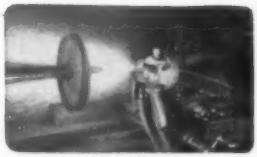
Circle No. 161 on Reader Service Card.

(Turn to page 92)

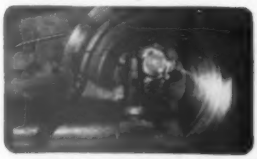


here's a really low-cost metallizing installation...

with the Metco L-Gun



Metallizing damaged journals on turbine shaft



Building up worn brake-drum

Metallizing protective coating on steel plate

New, low, compressed-air requirements . . . only 10 cfm at 40 to 60 psi, already available in many shops, or supplied by inexpensive 3 hp compressor . . . bring metallizing within reach of the small user.

Here's a chance for the smaller maintenance shop to get into profitable metallizing operations like these:

- Save up to 90% of replacement costs on machine repair jobs,
- Do your own hard-facing,
- Apply long-wearing corrosion-resistant coatings to exterior plant structures, tanks and other equipment.

Sprays 23 Different Metallizing Wires—With the new L-Gun you can spray .10, .25, .80 carbon steels, stainless; babbitts, brass, bronze; nickel, aluminum, tin, zinc; special hard-facing materials such as Metco-Weld H, and the new self-bonding Sprabond wire.

It's Versatile—Use the L-Gun machine-mounted or hand-held—it weighs only 4 lb. 2 oz. Do all kinds of metallizing work—shaft and bore build-up with harder, longer wearing metals; build up worn pump plungers, crankshafts, motor shafts; apply corrosion-resistant coatings. There are hundreds of different jobs that are "naturals" for metallizing.*

Same High Quality as Other Metco Guns—The low air requirements of the new L-Gun have been achieved without any sacrifice in Metco quality. It embodies new developments in turbine and nozzle construction—is built, like all Metco guns, for rugged, dependable service.

A Real Opportunity for the Smaller Shop—Thousands of large, well-known companies have been metallizing users for many years, not only in maintenance but in production applications on original equipment. Now, with the development of the new L-Gun, and a low cost installation, metallizing is within the reach of even the smallest plant. (We'll be glad to send you the names of some Metco users—large and small.)

Free Bulletin or Shop Demonstration—Send off the coupon for the detailed information Bulletin 55 gives you. Or, better still, ask for a demonstration in your own shop by a Metco Field Engineer. He'll be glad to show you how the new Metco L-Gun works on some job of your own. No obligation, of course.

See other examples of metallizing illustrated in our 8-page Bulletin in your Sweet's Plant Engineering File—Section 7a/Me.

The following names are the property of Metallizing Engineering Co., Inc.: Sprabond Wire, Metco-Weld, Metco®. *Reg. U.S. Pat. Off.

Metallizing Engineering Co., Inc.
1125 Prospect Ave., Westbury, L. I., New York • cable: METCO
In Great Britain:
METALLIZING EQUIPMENT COMPANY, LTD.—Chobham near Woking, England

BON A. WATSON
METALLIZING ENGINEERING CO., INC.
1125 Prospect Ave., Westbury, Long Island, N. Y.

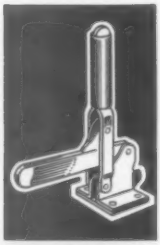
☐ Please send me more information about metallizing.
☐ Please arrange a demonstration in my shop.

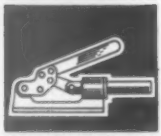
Name_____
Company_____
Street_____
City_____ Zone____ State_____

Circle No. 62 on Reader Service Card.

WESPO

TOGGLE CLAMPS





NOTE THESE IMPORTANT FEATURES:

1. **Reamed holes**—for better bearing
2. **Hardened Bushings, Serrated to prevent turning**
3. **High tensile strength rivets**—for longer service.

Corrosion resistant black oxydized finish.

A CLAMP FOR EVERY WORK HOLDING NEED

36 Sizes Available

WESPO TOGGLE CLAMPS are engineered and constructed for positive holding and light, medium and heavy clamping.

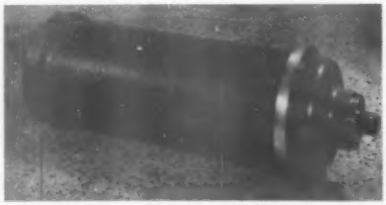
West Point Mfg. Co.
26941 W. SEVEN MILE RD.
DETROIT 19, MICHIGAN
TWX—DE894

WRITE for FREE BULLETIN

Circle No. 101 on Reader Service Card.

End-Grounded X-Ray Unit

An end-grounded unit with X-ray source at one end of the head, the Baltograph 180 is an X-ray unit introduced by Balteau Electric Corp. to enable oper-



ators to reach otherwise inaccessible locations. Rated at 180 KVP, and weighing only 119 pounds, X-ray head can be equipped with a tube for 360° radiation or with an angle target tube giving an output of 10 MA with an inherent filtration of ⅛-inch beryllium.

Circle No. 162 on Reader Service Card.

USE THE READER SERVICE CARD FOR VALUABLE REFERENCE DATA

Aluminum Electrical Tape

A new, pressure sensitive, aluminum foil tape used as a moisture vapor barrier in electrical cable splices, has been intro-

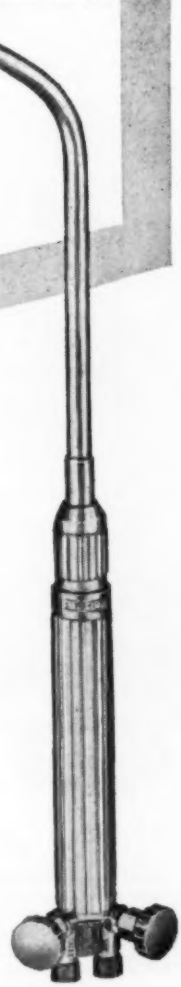
duced by Minnesota Mining and Manufacturing Co. Called "Scotch" brand electrical tape No. 49, the new tape has been approved for use, by the REA.

It is recommended for use in taping operations on plastic insulated-plastic sheathed cable splices and also where such cable is spliced to conventional paper insulated-lead sheathed cable. The tape is available in 2-inch by 20 foot rolls.

Circle No. 163 on Reader Service Card.

(Turn to page 94)

Here's why
PUROX BLOWPIPES
Trade-Mark
cost so little to use and maintain



- **SELF-SEATING VALVES**
  Reseat scored valves when turned tight.
- **RUGGED HANDLE ASSEMBLY**
  Wear-resistant bronze front body—heavy-walled seamless tubes—pressure forged valve body; all built for long, trouble-free service.
- **SLIP-FIT "O" RINGS**
  Eliminate critical metal-to-metal gas seals. Easy to replace.
- **MIXER IN EACH HEAD**
  Delivers perfect gas mixture for easiest and best work. New design resists backfires, eliminates burnouts.
- **SWAGED, PURE COPPER TIPS**
  Streamlined gas flow and exceptionally stable flames. Heads snap in and out of handle. No wrench needed.

•

The PUROX W-202 blowpipe (illustrated) is available with 13 standard welding heads and 3 multiflame heating heads, all of the snap-in type. Ask your LINDE jobber for a demonstration or write for further information. LINDE AIR PRODUCTS COMPANY, a Division of Union Carbide and Carbon Corporation, 30 East 42nd Street, New York 17, N.Y. In Canada, Linde Air Products Company, Division of Union Carbide Canada Limited, Toronto.

GET IT FROM YOUR **LINDE** JOBBER

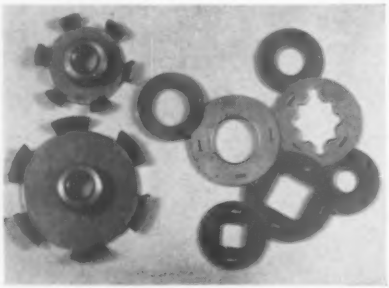
The terms "Purox" and "Linde" are registered trade-marks of Union Carbide and Carbon Corporation.

Circle No. 58 on Reader Service Card.

Cup Grinding Wheel Insert

A cup grinding wheel insert developed by Carroll Pressed Metal Co. is key to a new grinding wheel insert assembly concentricity and increases overall safety which increases holding power between threaded hub and another disc, improves factor in operation.

Disadvantages and defects of previous methods of joining hubs to anchor discs



were most evident in severe applications of cup wheels, particularly in snagging operations. The hub might actually become loosened from the anchor disc.

Answer to these difficulties was to substitute shearing strength for the friction formerly used to transmit driving torque. This is accomplished in the new insert assembly by lancing outward six sections of the steel hub into rectangular slots around the bore of the anchor disc.

Circle No. 164 on Reader Service Card.

USE THE READER SERVICE CARD FOR VALUABLE REFERENCE DATA

Welding Cable Reel

The new Weldreel Model EA welding cable reel introduced by United Specialty Co. holds 100 feet of 2/0 cable and is the latest addition to the company's Weldreel line of reels for welding hose and electric cable. Units were developed to reduce fire and accident hazard of leaving hose and cable on floor when not in use and to extend their life by storing them carefully. All models feature heavy spring and gear mechanisms which make it easy to pull out, lock and rewind the hose or cable. Units may be easily mounted on floor, wall, ceiling or on mobile equipment and require only a small mounting area.

Circle No. 91 on Reader Service Card.

FIRST TRULY PORTABLE 200 AMP. ARC WELDER

Weighs only 65 lbs.; carry it to the job!

WELDS 2 PIECES OF 1½ in. STEEL!

11"x 12"x 7½" List Price **$169.50** F.O.B., L.I. City, N.Y.

BREN-WELD MODEL 200 AW

Featuring the new **TRANSOIDAL TRANSFORMER**

(A development of the toroidal coil)

(Fully protected by patent applications)

Lowest Price on Market for Comparable Ampere Rating

Obsoletes All Other Welders of Comparable Rating!

Portable BREN/WELD does the work of conventional welders 4 to 5 times its size and weight. Eliminates the need to transport bulky equipment or heavy parts.

BREN/WELD handles electrodes from 3/32" through 5/32", has adjustable arc voltage for various arc characteristics.

Ideal for plant production and maintenance, construction work, railroads, on the farm and in home workshops.

24 HOURS DELIVERY FROM STOCK!

Comes complete with 2-10 ft. cables, ground clamp and electrode holder.

● 200 Amp. At 50% Duty Cycle ● 110/220 Volts A.C., 50/60 Cycles ● Also available For 220/440 Volts ● Simple To Use—Fully Guaranteed ● Has An 80% Power Factor.

FREE! For details of free trial offer and folder see your dealer or write directly.

A KASSON PRODUCT

Manufactured by BRENNEN, BUCCI & WEBER, INC.

SALES DIVISION

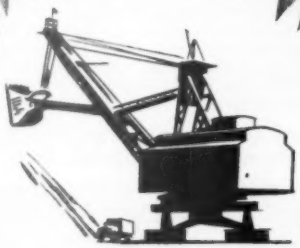
KASSON DIE & MOTOR CORPORATION

INTEGRITY SINCE 1919

32-14 Northern Boulevard, L. I. City 1, New York

Circle No. 55 on Reader Service Card.

ARCOS FOR FINEST QUALITY WELDS



Mountains crumble as **welded** jaws bite in

Modern power shovels gulp truckloads of rock and dirt at one bite. It's a good example of how *welded* high tensile steels make possible bigger payloads—provide extra strength and toughness to reduce maintenance.

An important factor in this achievement is the quality of weld metal. That's why so many fabricators today specify Arcos Low Hydrogen Electrodes when welding low alloy high tensile steels. *On any job* demanding shock and abrasion resistance . . . maximum strength and ductility, the excellent properties of Arcos weld metal assures the results you want in service. Arcos offers quality weld metal and technical assistance that is second to none. Arcos Corporation, 1500 South 50th Street, Philadelphia 43, Pa.

WELD WITH ARCOS

LOW HYDROGEN ELECTRODES

Circle No. 13 on Reader Service Card.

MR. WELDING SUPERINTENDENT

Tipaloy

Tipaloy #130* is the answer to users who know the difference between PRICE and COST when it comes to Resistance Welding electrodes.

You want all the welds you can get for the least money.

Insist on TIPALOY "Straight-Line" Tips.

Tipaloy electrodes are precision made from Tipaloy's own patented alloy, assuring you satisfaction.

30% TO 100% LONGER TIP LIFE
Resulting in longer runs without shutdown for maintenance AND more welds per electrode.

Tipaloy Quality is the accepted standard for efficient welding at lower cost. Prove this on your own machines in your own shop. SEND YOUR TRIAL ORDER TODAY.

FREE: Write for your copy of Tipaloy's Comprehensive new catalog.

DISTRIBUTORS & REPRESENTATIVES: Several attractive territories still available. Write for complete information.

*RWMA Class #2 Alloy

Tipaloy INC 1435 EAST MILWAUKEE DETROIT 11, MICHIGAN

Circle No. 89 on Reader Service Card.

Pneumatic Cup Wheel Grinder

Introduced as the lightest, most powerful six-inch pneumatic cup wheel grinder on the market, Cleco Air Tools' new 2000 Series weighs only 10½ pounds, without guard, is only 7⅝-inches high and owes

most of its reduced weight to a magnesium housing and redesigned rotor.

The grinder can use either straight-type abrasive wheel with guard attached to grinder body, or the flanged cup abrasive wheel with the revolving cup guard. Grinder-attached guard is removable without affecting motor assembly.

Circle No. 165 on Reader Service Card.

Measure Weld's Iron Content

A non-destructive instrument for measuring iron content in a stainless steel weld is now available from Ferro Corp. Called an "elcometer" the pocket-size instrument permits a rapid indication of ferrite content at various points along a weld.

Operation is based on the principle that increase of magnetic flux intensity

between two soft iron test probes of a U-shaped magnetic circuit reduces the forces a spring-loaded magnetic needle in a parallel magnetic branch. Tension of spring is adjusted so needle gives a scale reading corresponding to ferrite content of a standard reference sample.

Circle No. 166 on Reader Service Card.

(More New Products on page 98)

ABSOLUTE SAFETY... COMPLETE COMFORT

No. 1250
Turretype helmet with lower bib curving inward.

Yours in every DOCKSON *Better Built* HELMET and HANDSHIELD . . . . . .

RUGGED AND DEPENDABLE—Complete protection against sparks, flash and arc welding rays.

BUILT FOR BETTER SERVICE—With these safety-comfort features: adjustable, cushioned headgear; form-fitting chin rests; spring pivot holds shield in any position—allows easy raising and lowering.

LONG LIFE AT LOW COST—One-piece construction—no rivets to tear, burn out, or loosen. Dockson Helmets are leak-proof, shock-proof, equipped with Federal Specification Plates.

No. 1225
Turretype handshield—built for long life.

No. 1525
Handshield—of the Herculite construction.

No. 1750
Turretype construction—moisture-proof, non-warping, lightweight.

Dockson CORPORATION
3839 WABASH AVENUE, DETROIT 8, MICH.

Write for your distributor's name and our complete catalog of Head and Eye Safety Equipment.

Circle No. 31 on Reader Service Card.

Snap-Back Lighter Chain

A new device that automatically returns torch lighters and other small tools and keys to the belt or to a handy spot on a wall or machine is available from CTL Company and Lummis Mfg. Co. Mechanically, "Key-Bak" units are pocketwatch-size, weigh less than 3 ounces and feature a heavily chromed case and 24-inch lightweight steel chain with swivel connection to prevent twisting. Strong, Swedish steel spring is said to insure automatic action for years.

A scabbard model that holds tools, lighter and keys at the belt is available.

Circle No. 167 on Reader Service Card.

Electric Metallizing Gun

An electrically-powered metallizing gun marketed by Arnold Serton, Inc., is said to have none of the disadvantages of its gas-operated counterparts. The new gun, which works with an air pressure of 100 psi without relief valve, gives high pressure speed, better adherence and tighter films, according to the manufacturer.

Easy to adjust, gun ignites immediately. A certain alloy of wire corresponds to a certain current value of the transformer. There are no other variable factors.

A low speed motor with epicylic gears minimizes wear and consumption of spare parts.

Gun has a high melting capacity. It can accommodate 55 lbs. of zinc per hour with a wire of about 1/16-inch; deposits of about 88 lbs. zinc per hour can be had by changing to heavier wire.

Two cables from transformer supply the whole amount of power.

Circle No. 168 on Reader Service Card.

High Temperature Brazing Flux

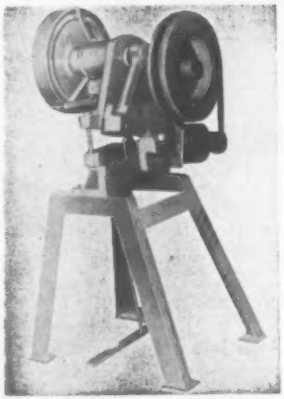
A new high temperature brazing flux is now available from Air Reduction Sales Co. Produced to meet the need for high temperature brazing of chrome and nickel alloys, flux is free flowing and active in a temperature range of 1400° to 2000°F. Stainless steel assemblies used in jet aircraft and in automotive, pharmaceutical and nuclear energy industries are suggested applications for the new flux.

Circle No. 169 on Reader Service Card.

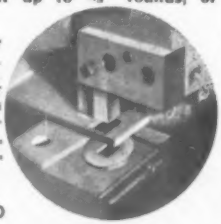
(Turn to page 100)

BATEMAN POWER SHEAR

IDEAL FOR THE USERS OF SMALL ANGLES OR FLATS



- **No grinding necessary after cut.**
- **Cuts angles up to 2" x 2" x ¼" and flats up to ¼" x 4".**
- **Flywheel with a gear drive for power with a small motor.**
- **A one stroke cycle clutch operated by either hand or foot.**
- **With clutch open, will make 44 strokes per minute.**
- **Made of high grade cast iron, hardened clutch and clutch pin, shear steel blades.**
- **From floor to top of machine—56" with stand. Floor to shear blade—36". Floor space required—24" x 27".**
- **With notched blade—will cut up to ¾" rounds, or ⅝" reinforcing rod.**
- **Special blade and punch for ornamental iron work.** ¾ HP. motor required for power. We furnish 2-groove motor pulley and 2 belts when ordered without motor. Shipping wt. approx. 485 lbs., without stand. With stand, 560 lbs.



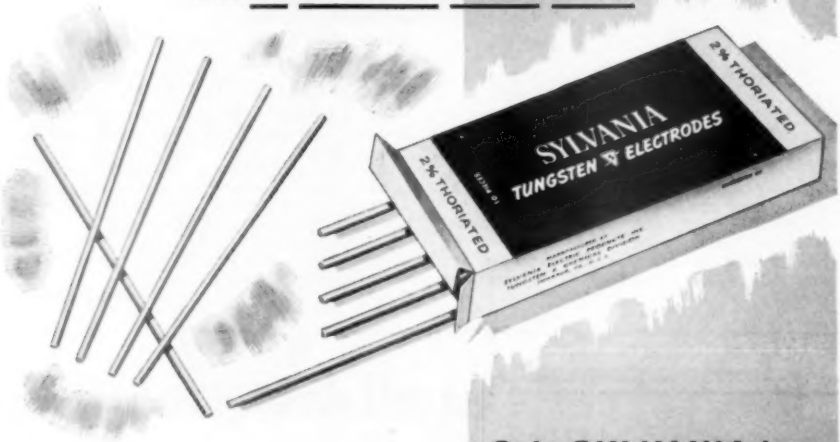
WITH MOTOR AND STAND $450.00

BATEMAN FOUNDRY and MACHINE CO. • Mineral Wells, Texas

Circle No. 19 on Reader Service Card.

They're here!

NEW 2% THORIATED
Sylvania Tungsten Electrodes
...at lowest cost ever!



Sylvania's new 2% Thoriated Tungsten Electrode is here—*at a lower price than you have been accustomed to paying for similar electrodes.*

For specific applications Sylvania 2% Thoriated Tungsten Electrodes give you easier arc starting, more stable arc, higher current capacity, longer life and increased resistance to weld pool contamination.

Remember . . . there is a *right* Sylvania electrode for *every* job. Your Sylvania welding distributor will gladly recommend the correct electrode. For technical information, write to:

SYLVANIA ELECTRIC PRODUCTS INC.
1740 Broadway, New York 19, N. Y.
In Canada: Sylvania Electric (Canada) Ltd., University Tower Bldg., Montreal, P. Q.

Only SYLVANIA has the complete line of tungsten electrodes—

- **Puretung**
- **Zirtung**
- **Thoriated**
- **2% Thoriated**

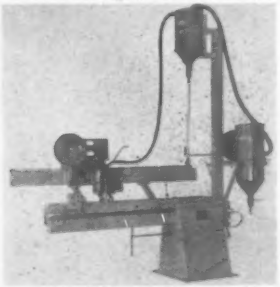
SYLVANIA

Lighting • Radio • Electronics • Television • Atomic Energy

Circle No. 85 on Reader Service Card.

New Seam Welder

The "Welco" seam welder, a development of World Electric Co., Cleveland, Ohio, features an exclusive circular-type copper back-up bar arrangement which is said to insure perfect weld back up



Thinner materials, as low as 16 and 18 gage, are easily welded by the submerged arc process. With the removal of one bolt, weld back-up can be changed from circular to grooved for use with steel back-up for U70 code or flux.

Clamping fingers are segmented to compensate for irregularities in sheet edges as weld seams, and individually adjustable to and from the center line to compensate for weld bead width. The fingers can be individually replaced, removed for repair and reset without disturbing any other part of the machine.

The new machine also features automatic flux pick-up, automatic filling of welding head flux hopper, automatic return of travel carriage to starting position, dynamic braking and optional fully automatic control.

Circle No. 170 on Reader Service Card.

Manganese-Bronze Rod

Ampco-Braz No. 3 is a manganese-bronze oxy-acetylene filler rod which has a good tinning action when used with ordinary brazing fluxes. It flows easily, has a relatively low melting point (1600°F) and yields high strength deposits with good ductility.

Developed by Ampco Metal, Inc., rod is said to be ideal for all-purpose general maintenance work.

Circle No. 171 on Reader Service Card.

---

cut weld cleaning time by 85%

Throw away your cold chisel and whisk off weld spatter with a dry rag! Protect-O-Metal spatter-proofing compounds make weld cleaning a breeze. Improve your welds at the same time . . . P-O-M compounds quiet the arc, improve fusion and electrode operation, prevent oxidation and annealing scale, cause no porosity. No smoke, odors, or fumes.

P-O-M No. 2. Non-inflammable, non-toxic, water-soluble paste. Inorganic. Thin before applying and start welding at once. $3.30 per gallon, f.o.b. Dayton.

P-O-M No. 8. Rust- and corrosion-resistant resin base compound. Comes ready to use. Safe for all metals. Good paint primer; permits outdoor storage of subassemblies. $3.35 per gallon, f.o.b. Dayton.

MONEY-BACK TRIAL OFFER
Order a trial gallon of each today for testing in your shop. We'll cancel the bill if you're not satisfied.

PROTECT-O-METAL

G. W. SMITH & SONS, INC.
5402 KEMP ROAD, DAYTON, O.

Circle No. 86 on Reader Service Card.

The NEW K-G "*On Guard*" REGULATOR

has a built-in crash helmet

The unique steel gauge guard on the new K-G "On Guard" Regulator fills a long-felt need. Like a built-in crash helmet, it protects the gauges against the hard knocks that are all in the day's work.

But this is only one of several valuable features, exclusive with K-G, that make the new regulator superior to others in economy, safety and performance. Strong, long-lasting stainless steel is used generously at all critical points such as the reinforced inlet nipple, the internal adjusting screw, valve stem and other internal parts.

A fully enclosed thrust-bearing, integral with the adjusting mechanism, provides smooth, easy pressure adjustment. Body and bonnet forgings, of a new aluminum alloy, have exceptional strength and corrosion resistance. Precision internal parts are protected by a sintered stainless steel Pressure Check Filtering Unit, eliminating the basic causes of regulator failure.

Available in both single and two-stage models for most gases.
Send for new bulletin.

K-G

UL

The K-G Equipment Company (Inc.)

A Unit of Air Products, Inc.

Dept. B, Box 538, Allentown, Pa.

Circle No. 54 on Reader Service Card.

A Do-It-Yourself Project . . .

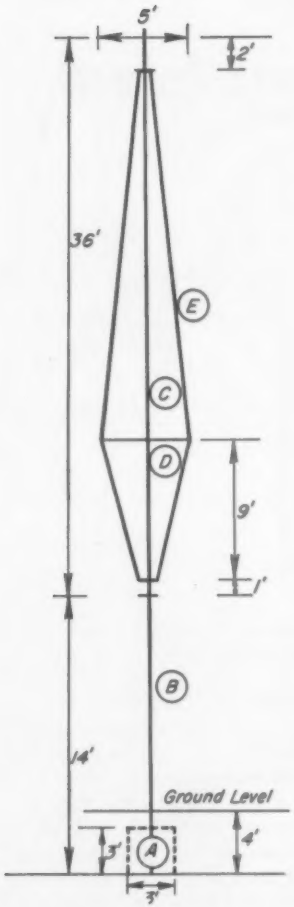
How to Weld a Free-Standing TV Mast

RESIDENTS of "fringe television areas" wanting good reception have two hurdles to overcome. Not only must they have sets with strong amplifiers, but they also must put their antennas on tall masts.

The conventional practice, of course, is to put the antenna atop the house. This is well and good until required mast height multiplies the number of guy wires and the assembly begins to look monstrous.

Enough people in these "fringe areas" wanting TV are concerned with the appearance of their homes, to create a substantial demand for free-standing masts, such as any welding operator can readily fabricate from materials that can often be picked up at low second-hand cost.

This step-by-step, how-to-do-it article is based on a design executed by George N. Groff Welding Co. of Cambridge, Maryland. The mast illustrated was fabricated by Edgar Gore, who also supervised its erection. It is pivoted and counter-balanced for one-hand lowering to service.



A. One cubic yard concrete
B. Six-inch H-column, 18" long
C. Telescope pipe to desired length—made up of 3", 2½", 2" and 1"
D. Oak spreaders
E. Guy wires tightened with turnbuckles

PHASE NO. 1 (see Figure 1)

Base must be in and "set" before the mast can be erected. Therefore, to get on with the job quickly, prepare the H-beam first. It goes 4-feet in the ground, 14-feet above and is set in concrete. Using special

arc welding electrode, weld the 3-foot angle scraps at right angles to each other 3-feet from the bottom of and across the H-beam.

Five feet from the bottom, use cutting electrode to burn two ⅜-inch holes through the web, one on each side close to the edge. Insert bolts and weld heads to web. At top of H-column cut web back 4-inches. Make one-inch slots (one each side) 2-inches deep at center of sides. These are to receive the pivot pin.

Take H-beam to site. Dig 3-foot square by 3½-foot deep hole (type of soil where illustrated mast was erected necessitated extending H-beam below concrete to facilitate getting exact height desired. There being no stone, rocking the beam on its base settled it to height wanted. Have yard of concrete dumped in the hole, plumb beam and brace it temporarily. Then spade the concrete around it. Let set a few days before erecting mast.

PHASE NO. 2 (see Figure 2)

Fourteen-inches from the bottom of the 3-foot pipe, weld a piece of the ¼-inch by 2½-inch steel

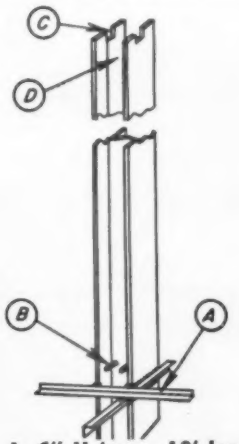


FIG. 1. 6" H-beam, 18' long

A. Scrap angle iron crosswise 3-feet from bottom

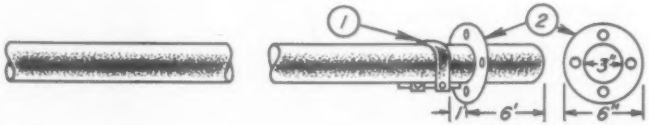
B. Bolts through web with heads welded to web 5-inches from bottom. These wide enough apart for 3-inch pipe to nest between.

C. 1-inch slots each side, 2-inches deep at center to receive pivot pin

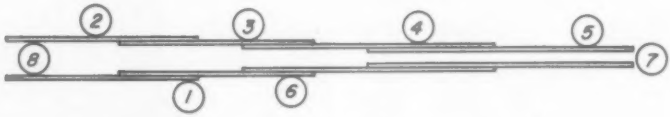
D. Cut web back

BILL OF MATERIALS FOR 50' TO 60' MAST

1—18' Beam—6" H (20# per foot)
2—Scraps 2" or 3" angle iron about 3' long
2—Bolts and cuts ⅜" x 5"
1—21' length used steel pipe—3"
1—21' length used steel pipe —2½"
1—21' length used steel pipe—2"
1—3' length used steel pipe—1"
1—10" steel pin—1"
2—scraps ¼" x 2½" steel totaling about 20"
2—scraps ¼" steel plate totaling about 1 square foot
Several cutting electrodes
Several special welding electrodes
15# wire rope—¼"
4 turnbuckles—¼"
16 Clamps—¼"
8 Thimbles—¼"
2 scraps oak 2" x 6" x 5'
4 staples
1 yard ready mix cement
135# scrap iron—small pieces



A. 21' length of 3" pipe
1. Strap around for pivot
2. Slots for attachment to guy wires. See detail "X"



B. Mast assembled for balancing operation:
1. Pivot
2. 3-inch pipe
3. 2½-inch pipe 10-feet into 3-inch pipe
4. 2-inch pipe 4-feet into 2½inch pipe
5. 1-inch pipe 2-feet into 2-inch pipe
6. Oak spreaders 10-feet past pivot
7. Weight representing antenna
8. Scrap iron inside 3-inch pipe to balance.

around it as shown (roll the pipe and weld downhand) leaving ends project to receive the pivot pins. Cut holes one-inch full so that one-inch steel pin inserted touches the pipe and is at right angles to it. Weld the pin into the holes on each side.

Cut a 6-inch circle out of the ¼-inch scrap. Cut a 3½-inch hole in its center and slip this over the pipe to a position one-inch above the pivot. Then weld. Cut four ½-inch holes through the rim as shown. These are later to receive the thimbles.

Support the 3-inch pipe at the pivot pin. Plug one end of the 2½-inch pipe with a piece of wood. Now slip it into the 3-inch pipe 2 to 3-feet past the pivot. Slip the 2-inch pipe into that, the one-inch into the 2-inch. Don't weld anything just yet. You are merely going to balance the mast after you adjust the telescoping pipe at the length wanted.

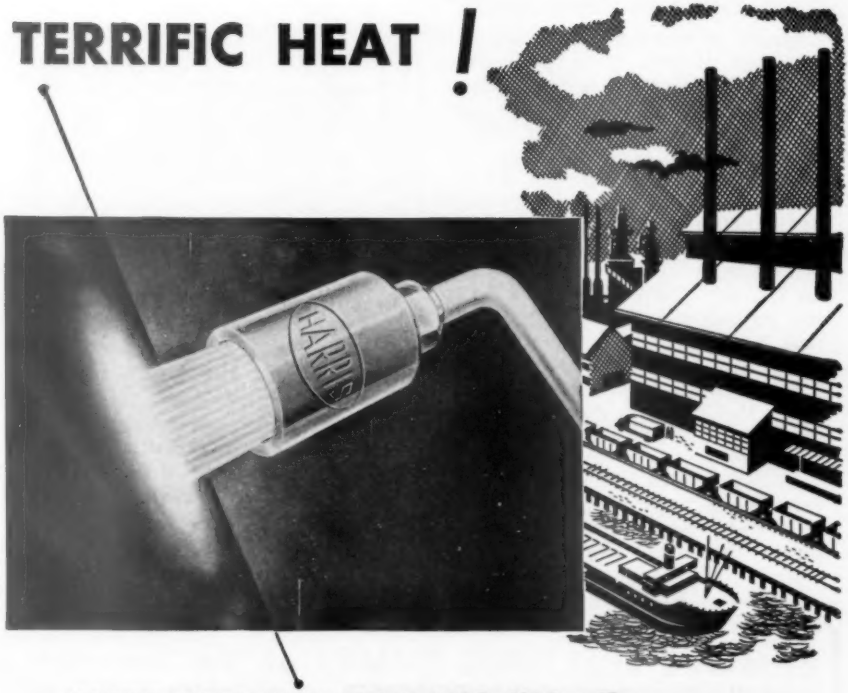
Need Rigidity at Pivot

Greatest rigidity is needed at the pivot and in the 10 to 12-feet above it. That's why you run the 2½-inch pipe past the pivot. If you're 3-feet past, you have in these two pieces a total length of 32-feet. For a 50-foot mast you need 18-feet more. For the antenna coupling you'll need about a foot of 1-inch pipe at the top, so use the 2-inch pipe for the next 17-feet. Slip it 4-feet into the 2½-inch pipe.

Diamond guy the part above the pivot like a ship's mast. The scrap of oak are for the spreaders, which need to be placed 10-feet above the pivot. Bore 3-inch holes in the

(Turn to page 106)

TERRIFIC HEAT !



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2 pieces at the center. Taper the ends as pleases your eye. Slip these over the pipe to their place. Now hang weight onto the 1-inch pipe to represent the antenna.

Complete Balancing

Now put your iron scraps into the 3-inch pipe at the bottom. Keep adding until the weight on that side of the pivot equals the weight on the other side. Take the scrap cut out of the 6-inch circle and tack weld it on the bottom to keep scrap from falling out. This completes the balancing operation. Mark the pipes to guide final assembly and take them apart. Now ram stone or gravel into the 3-inch pipe above the scrap so that your 2½-inch pipe, when inserted, will keep the counterweight in place. This slight amount of added weight will be of no consequence.

Insert the 2-inch pipe and make a 2-pass circumferential weld, rolling the pipe to weld downhand. Make the first pass in the groove. The second pass, make the bevel. You will, of course, have to be careful about alignment to insure getting a straight mast.

Near the lower end of the 2½-inch pipe cut a half-inch hole through the side wall of the 3-inch pipe and weld. This ties the two together in such a manner as to take some of the strain off the joint.

Cut another 6-inch circle and put a 3-inch hole in its center. Slip this over the 2½-inch pipe to the underside of the location for the spreaders. Tack weld to pipe, square and make a one-pass weld

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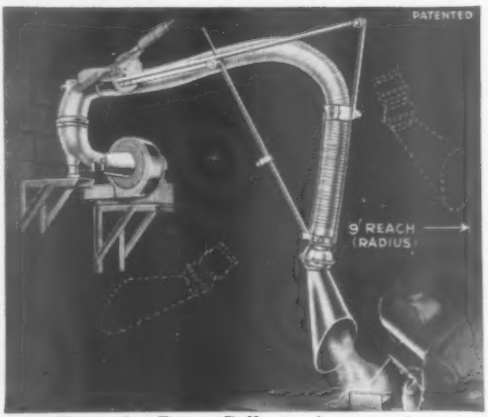

Ruemelin Fume Collector in operation.

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around. Pierce in four places for nails, bolts or screws to secure the spreaders.

Slip in the remaining pieces of pipe and weld in same manner as before, making sure to tie the butt as previously described.

Cut a 4-inch circle and make a 2½-inch hole in its center. Slip this over the 2-inch pipe just below the one-inch stub and weld in place. Cut four holes for the thimbles.

Close the top of the one-inch pipe. This is done to keep water out.

All pipe telescoping makes a fairly snug fit except the one-inch going into the two-inch. Neatest appearance is made by cutting small Vees in the end of the 2-inch pipe, bull-nosing and welding.

Now pull on your guy wires, using the turnbuckles to draw the mast into line. When they are taut, drive staples in the ends of spreaders to secure.

Use "Block and Fall"

The mast is complete and ready to be erected. A simple block and fall on a "gin" pole can raise it into place and drop the pin into the slots at the top of the H-beam. If the balancing has been approximately right, the butt will be heavier until the antenna is attached. It is to be secured in the channel of the H-beam between the two bolts.

Take the final piece of ¼-inch by 2½-inch scrap. Cut holes in each end for the bolts, put on and run up the nuts.

Technicians can lower the mast for servicing and when they attach the antenna and lead-ins, the whole will be nicely balanced. No special equipment will be needed.

Data courtesy of All-State Welding Alloys Co., Inc.

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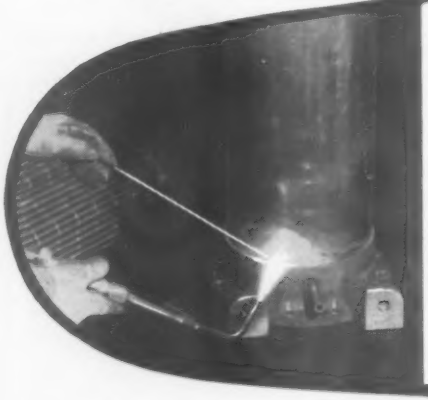

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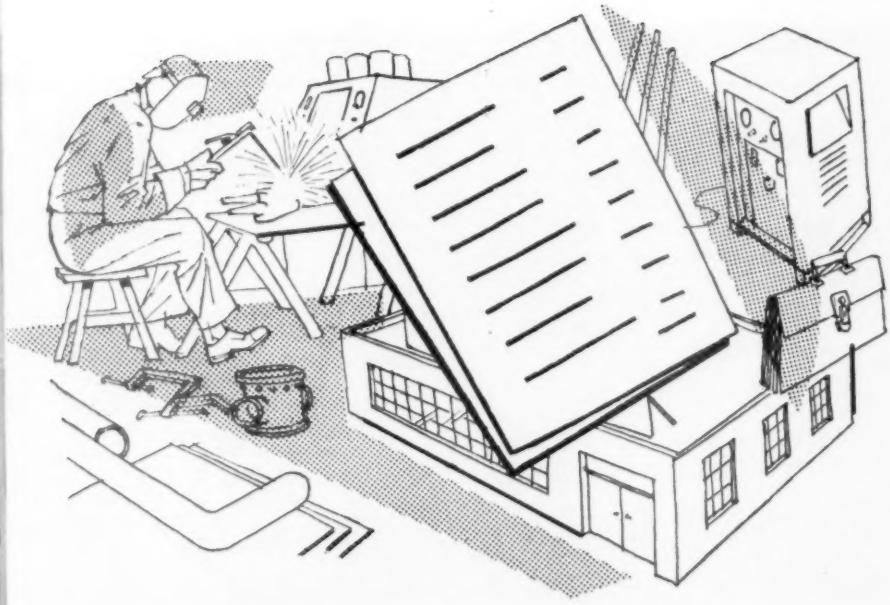

by PAUL LOCKWOOD

HOW TO DETERMINE

Standard Costs in Welding Shops

Your prices can be based on "quesstimates" or on predetermined costs—your standard costs . . .

WELDING shop management has found the use of a system of cost standards helpful in management and in control of the shop for these four reasons:

1. Spotlights cost elements which are out of line with high profit welding shop management.

2. Provides information for planning production and establishing realistic competitive prices.

3. Builds a stronger spirit of cooperation of everyone in the shop to meet or beat the established cost standards.

4. Keeps routine bookkeeping entries at an absolute minimum for a cost accounting system.

In determining the standard costs for your welding shop, you will need to follow a program that is specifically keyed to your own operation. There are no standard costs that can be used universally —standard costs are *your* standard costs instead of those for the entire

"Standard welding costs are *your* standard costs"

welding industry.

Here is a program you may find easy to follow to set up standard costs for your welding shop:

Establish Base Costs

Each type of welding you do has a variety of cost elements. And, these will vary with each different job. The quality and quantity of supplies needed, the amount of direct and indirect labor involved, and the portion of the shop overhead will be different on every job turned out by your welding shop.

First, you will want to classify the different types of welding jobs you handle. An easy way is to use a standard twelve-column accounting work sheet to record the information. List the types of jobs for which you are establishing standard costs down the left-hand side of the sheet.

This should be further sub-divided to include any variations. For instance, in determining standard costs you will want to sub-classify the types of jobs into sizes, quantity, quality, and materials used.

Next, you will apply the major cost elements to the different welding jobs you do. This will include all of the materials, the labor and the overhead required for the jobs for which you are establishing standard costs. This division of your various cost elements are entered at the top of each column across the top of your twelve-column standard cost work sheet.

Material costs are considered a direct cost by most welding shops. This may be uniform for each job, but if quantity discounts on materials enter the picture, the cost will vary with the larger quantity being considered.

Direct labor costs will be subdivided into the various activities involved. Cost for this will be based on your own estimate of the direct labor charges for different types of welding jobs handled in your shop.

For instance, you may have direct labor charges in several different activities. Other activities (or subdivisions of these) involved in the different welding jobs will expand or reduce the number of columns you will need to record these cost estimates for your standard costs.

Overhead expenses may be determined on the basis of quantity or in some ratio to the direct labor charges. This phase of standard costing will be more of an estimate when first established than the direct labor or material charges. As you accumulate more and more information on the basis of your cost accounting system, you will find ways to make adjustments that will give you a more realistic picture for your welding shop's standard costs in the future.

Adjust For Variations

Standard costs are of the moment. Changes in the local and national economic picture will demand making adjustments in the standard costs for your shop to keep them up-to-date, competitive, and profitable.

With a complete breakdown of the various cost elements involved in your standard costs, you are ready to quickly make any adjustments in the established costs. For instance, if certain material costs advance, you can quickly make the adjustments for the items involved in this change. If wage

(Continued on page 119)

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Are You The Man in this Picture?

IF the man above could be you, don't read further. If not however, if you don't take advantage of the many types of valuable data—practical and technical — offered *free* each month in INDUSTRY AND WELDING, take a minute and read on.

From the letters we receive each day, we know that thousands of readers use INDUSTRY AND WELDING as an important tool on their jobs. There are several easy ways to take advantage of this tool.

First, the methods and procedures described in each issue are designed to start you thinking about how you can adapt them in your own plant. They have "paid-off" for other companies and can do the same for you. But that's only part of it.

In addition, we present each month more than 100 offers of literature—charts, bulletins and catalogs—which contain a wealth of important information. To make it easy for you—because we know you are busy—we have numbered every advertisement, every new product, each piece of literature offered.

To receive this valuable information — on every possible welding problem — just circle the proper number on the handy Reader Service Card which is bound into each issue. Join the thousands who use these cards every month. Take full advantage of the valuable tool represented by Industry and Welding.

Plant suggestion systems pays off for both employer and employee at Maytag Company. Here's how . . .

Special Electrodes Make Spot Welding More Efficient

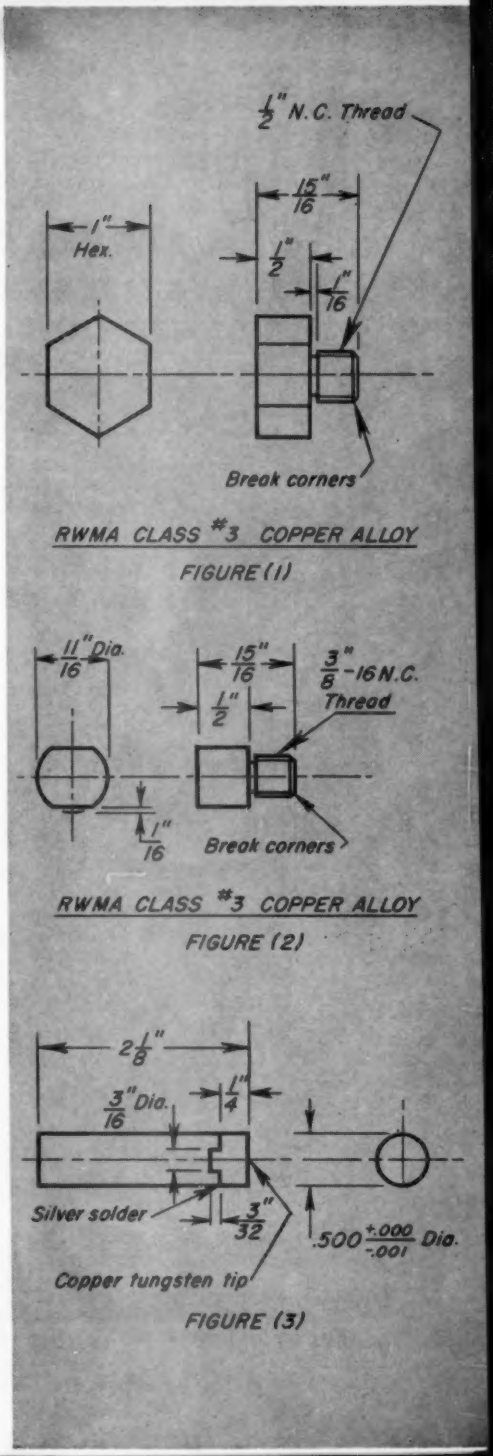
EMPLOYEES of more than 400 American companies split up a $5,000,000 melon every year. That is their take on suggestions made and accepted as worthwhile through plant suggestion systems. An expensive way to encourage brainstorms? Not at all; it actually makes money for the company.

The idea behind the plan is simple: The operator of a machine has a better practical understanding of his single job and knows a lot more about that one task than anyone else in the plant. If stimulated to think about ways in which to improve that job, he can give expert advice.

Three Ideas Pay Off

One firm which makes extensive use of this expert advice is the Maytag Company of Newton, Iowa. A recent series of three cash awards made by the company covered suggested improvements in resistance welding electrodes used in fabricating washing machines and dryers, ironers, stoves and refrigerators.

The first suggestion was a threaded button-type electrode



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(Fig. 1) which replaced flat electrodes in projection welding operations. This idea made changing electrodes easier and earned the contributor $65.22.

The second suggestion also made changing of electrodes easier. In this case an operator suggested use of a threaded hexagon-shaped electrode (Fig. 2) instead of a flat one. This earned $15.63 for the operator.

In each case, the new electrodes were made from Resistance Welder Manufacturers Association Class No. 3 Alloy.

Hard Cap on Soft Electrode

The final suggestion was to cap certain welding electrodes with a hard copper-tungsten alloy tip (Fig. 3) to improve weld quality and increase electrode life. Previously used soft copper alloy electrode has caused dinging at the metal finish operation. The hard copper-tungsten tip is silver soldered to a body of soft copper alloy.

The operator who suggested this change netted $58.76.

For Valuable Reference Material Available At No Charge
See Page 10

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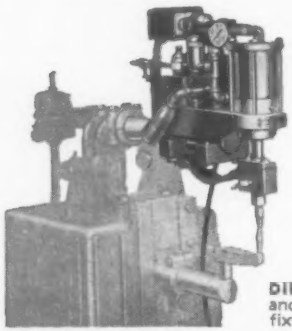

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WHICH PIPE WELDING BEVEL

(Continued from page 51)

vantages in using a wider bevel is that the stringer-bead welder has more clearance in which to work and can control his welding puddle more readily. Also, cleaning of the stringer bead is easier and faster. This means that the hot pass can be started sooner and with less loss of heat than with the 30° bevel. Thus, the time interval between starting and finishing the two most important beads in the completed weld can actually be reduced with a wide bevel as compared with the narrow. This is of importance since it results in less heat loss between beads and consequently with a lower degree of inherent welding stress.

Controlled Tests

Much can be said for controlled tests in pointing the way toward the solution of any problem. But in the final analysis of this problem the criteria must be in the performance of welders in the fields.

Top-notch welders under test conditions should make a good-quality weld using either bevel. But in the field, when conditions are far from these in a test setup and welding proficiency is very probably lower, the question of bevel angle becomes more acute. Here is the place to test merits of the two bevel angles.

Records on the loop lines of Natural Gas Pipeline Co., and the main line of Texas Illinois Natural Gas Pipeline speak for themselves in this respect.

**Refer to report by A. G. Barkow, "Notes on Stringer-Bead Cracking Problems in the Welding of High-Yield-Strength Pipe," A.S.M.E. Petroleum Mechanical Engineering Conference, Tulsa, 1951.*

When heavy, unwieldy weldments like these diesel crank cases can be quickly swung into any position so that every weld is made downhand — that's efficient welding!

Welders spend more time welding — do better welding at lower cost when they work with C-F Positioners because these hand and/or power operated machines reduce positioning time to a minimum. Investigate the cost-saving advantages of C-F Positioners. They pay their way in any company.

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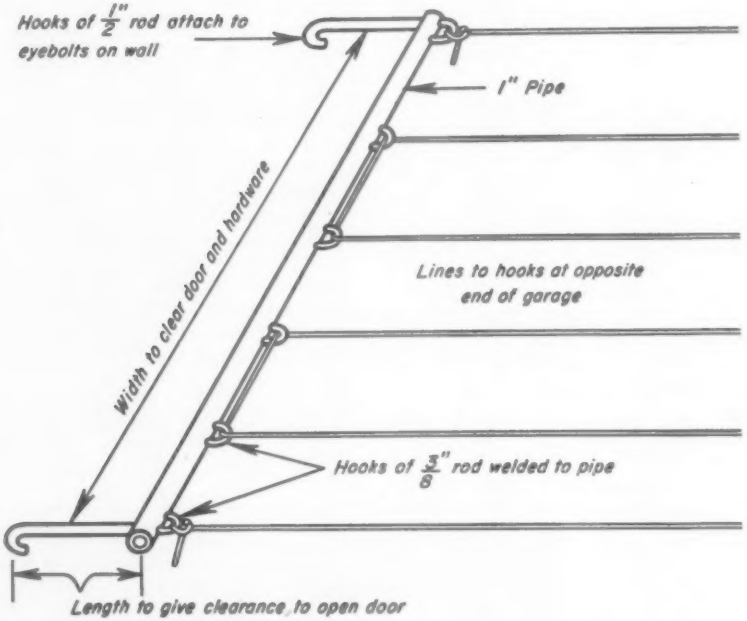
Hooks of 1/2" rod attach to eyebolts on wall
1" Pipe
Width to clear door and hardware
Lines to hooks at opposite end of garage
Hooks of 3/8" rod welded to pipe
Length to give clearance to open door

QUICK DETACHABLE CLOTHESLINE SUPPORT

Welded Clothesline Support

BAD weather on washday usually brings the problem of finding space indoors for drying the laundry. One solution is to use the space provided by heated garages which are attached to many of today's homes.

However, the providing of adequate line space for hanging the wash presents another problem. The removable line shown here can be the solution.

The brackets holding the lines are comparatively light in weight and are easily hung on the garage wall, out of the way, when not in use. Six lines provide nearly 120 lineal feet of space. If the line is properly hung, overhead-type door can be opened or closed with the line in place.

Opening the door on warm winter days often hastens drying.

Adapted from "Projects in Metal," published by James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

OPPORTUNITIES

Rates: $25 per column inch. $10 per column inch for "Position Wanted" ads. Payment must accompany order.

WANTED: Used SHAPE CUTTING MACHINES

Airco 6B Oxygraph or No. 50 Travograph; Linde CM-41 or CM-23 in good operating condition. Write giving price, complete description; list accessories and attachments.

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4330 Union Rd. Buffalo 25, N. Y.

MANUFACTURERS' REPRESENTATIVES

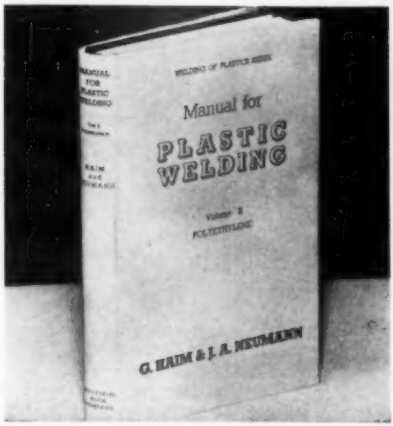
WANTED to handle line of Welding and Brazing Fluxes. Most territories in United States open. Write to Box 2156, Industry & Welding Magazine, 1240 Ontario St., Cleveland 13, Ohio.

For Valuable Reference Material Available At No Charge
See Page 10

Expansion Program at Kaiser Aluminum

A $90-million expansion program involving five of the company's principal manufacturing plants is now underway at Kaiser Aluminum & Chemical Corp. Major emphasis centers on the corporation's plant at Ravenswood, W. Va. (shown above), where an additional $75-million dollars is being spent. Plant will have an annual capacity of 320-million pounds of aluminum sheet and 13.5 million pounds of aluminum foil.

PLASTIC WELDING



VALUABLE NEW DATA

During the last few years gas welding of plastics has been applied with particular success to a large and ever-increasing variety of constructions where it has proved invaluable. Information on this subject is rather scarce. This manual will be extremely valuable to practical welding people and to engineers who intend to incorporate plastic materials into their designs.

PRICE $6.00

Industry & Welding

1240 ONTARIO STREET
CLEVELAND 13, OHIO

POSITIONING . . .

(Continued from page 61)

variable-speed motor automatically positioned the boiler so that the welding zone was always horizontal.

A cam-controlled levelling device, mounted on the carriage, controlled operation of the positioning motor. Guide rolls rode the welding Vee behind and beneath the main cable coupling.

With suitable positioning equipment, and templates where necessary, repetition work that includes weld seams irregular in contour can be readily fabricated by automatic welding.

This is a digest of an article which appeared in a recent issue of WELDING & METAL FABRICATION. Originally written by C. W. J. Vernon, it has been revised by Dave Ritchie, associate editor.

FLAME CUTTING . . .

(Continued from page 67)

the template. And the torches require occasional cleaning and adjustment. But the process is amazingly automatic.

The result? Mass production of weldment parts that are uniformly accurate, parts that fit precisely and smoothly, assuring maximum strength with minimum weld time. The economies of this process are immediately apparent.

Electronically - controlled flame cutting adds to the operating efficiency, appearance and durability of Marion excavators — subtracts from their weight and cost.

If all the INDEPENDENT Acetylene CYLINDERS

we have built were filled at one time they would hold more than

60,000,000

cu. ft. of gas!

Furthermore, Independent Acetylene Cylinders hold from 5 to 10% more gas, and the uniformity of the monolithic filler insures even distribution of acetone. Oxygen storage cylinders available in 12 ft. & 20 ft. lengths; capacities 850 and 1500 cu. ft.

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O'Fallon 2, Illinois

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WELDING COSTS . . .

(Continued from page 110)

rates increase, you can make adjustments in the production involved.

These adjustments are keyed specifically to each column of your standard cost work sheet. For instance, if wages in one job classification advance, you will make adjustments accordingly in all items included in this column. This will save a great deal of time and keep your standard costs in line with the current conditions.

If your adjustments are made promptly (up or down) and are based on the changing conditions, you will find that your actual costs follow your standard costs closely. This, of course, will make you more competitive and will insure better profit operation for your welding shop.

Profit Sharing at Lincoln

Every year, beginning in 1934, The Lincoln Electric Company, Cleveland, Ohio, has paid an annual incentive bonus to its employees. In 1955 the company paid $5,409,000 to 1236 employees, an average of $4375 per employee.

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MANGALLOY
FOR BUILD-UP AND STRENGTH
TRADE MARK

11-13½% Manganese Nickel Steel Products

Welding Electrodes
Bare and coated for DC and AC. Easy to use for joining high manganese steel shapes, bars and plate. Excellent for build up on worn manganese steel castings.

Wedge Bars & Wedges
Easily cut by flame or arc and welded with Mangalloy electrodes.

Dipper Tooth Repointers
Cast in a wide variety of shapes and styles for all applications.

Alloy Steel Grouser Bars
Easily welded with mild steel rod for repairing tractor shoes.

ALSO
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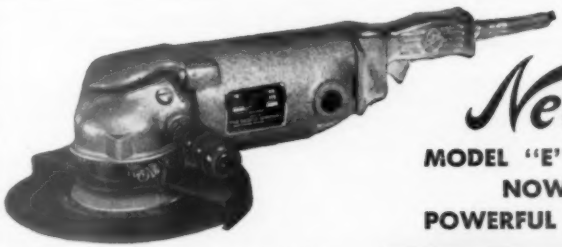

THE NEW
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MODEL "E" SANDBRUTE
NOW WITH
POWERFUL 2HP MOTOR

Write today for new 4-page bulletin that describes complete line of Nedco grinders, sanders and polishers. Operating specifications and price data are given.

THE Nedco COMPANY
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How Specialization Pays Off In Tool and Die Welding

by **CHARLES BERKA, Associate Editor**

WITH some 4000 small tool and die shops located in and around Detroit, Michigan, it is logical to assume that a firm which specializes in the welding of tools and dies would prosper.

Proof of this assumption is the Owens Welding Company. This firm, which started some 25 years ago as a general industrial welding firm on Orleans Street in the Motor City, now does nothing but cater to those small tool and die shops and to tool and die departments of automotive manufacturers, including Ford and G.M.C.

As a result, the firm has had a

Arc welders, and welding fume, exhaust system, are positioned along East wall of new building. Welding electrodes are stored in handy, wall-mounted racks.

rapid growth in recent years. Under the direction of owner, Rex Farmer, the company has added two additional plants. One, on Chadwick Avenue, serves the West Side of Detroit, while the other located in Hazel Park covers the Northeast. As a result, the firm is able to give prompt service to an ever increasing number of customers in the Metropolitan Detroit area.

The Hazel Park plant, which houses the firm's general offices, is typical of the efficiency and thoroughness of the company's opera-

(Turn to page 122)

Two carburized steel spline halves (opposite page) are joined by two small tacks made by inert arc welding. Welds are made at 40 amps using $\frac{1}{16}$-inch filler rod and argon shielding gas. Plastic covers protects splines.

Air-hardened die section (above left) had to be repaired without affecting its hardness. Job was done with $\frac{3}{32}$-inch diameter air-hardening electrode which matches composition of die section. Welding was done at 150 amps.

Machine steel chuck jaws (above, right) are built up with $\frac{1}{8}$-inch overlay for increased wear resistance. DC welding was done at 75-80 amps, using $\frac{1}{8}$-inch coated stellite electrode. Part was preheated to 400 F.

Inert gas-shielded arc welding equipment, gas furnace and positioners are situated along West wall of new Hazel Park plant of Owens Welding Co.

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reduce wear . . .
save repairs . . .

Keep TRUCK BOTTOMS, SKIPS, CHUTES and HOPPERS producing longer!

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- Last much longer than original parts.
- Stand up under severe impact and abrasion.
- Easily fabricated.

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SOLE PRODUCERS
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tions. Arranged for maximum efficiency in specialized welding, the plant is one of the best equipped in the country. In addition to the regular arc welding equipment, Owens Welding has the latest in

Engineering changes are made in experimental model of diecast aluminum carburetor by inert arc welding. Part is preheated to 600 F and welded, using 40-60 amps, ⅛-inch 5-percent silicon rod and argon shielding gas. Modeling clay, which shows changes to be made, is removed just before welding.

inert arc and atomic hydrogen equipment, both of which are a *must* when it comes to welding tool and die steels and special alloy steels, such as chrome-nickel,

which weldor
has the
*TWECO-LITE?
*the new ALUMINUM welding cable that weighs half as much, lasts longer and costs less
A Product of
TWECO PRODUCTS COMPANY
Wichita 1, Kansas

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stainless and various chrome-tungsten-cobalt alloys. A gas furnace is available for important preheating and postheating operations.

The plant is laid out to give highly skilled operators best possible working conditions. Clean and well-lighted, the shop is equipped with fume exhaust and positioning equipment to make each operator's work easier.

In addition to repair and rebuilding work, the firm does much welding to incorporate engineering changes in tools and dies and sample parts.

A comparatively new operation at Owens is fabrication of large trim dies, such as roof and door dies, which are cast to shape from mild steel and have all cutting edges welded on. This eliminates the necessity for casting the entire die from expensive tool steel and reduces die costs considerably.

Cooper Joins G.E. Cleveland Sales Force

Bill Cooper is the latest addition to the Cleveland Sales Force of General Electric Co. Cooper has an extensive welding background in welding and is a member of the American Welding Society.

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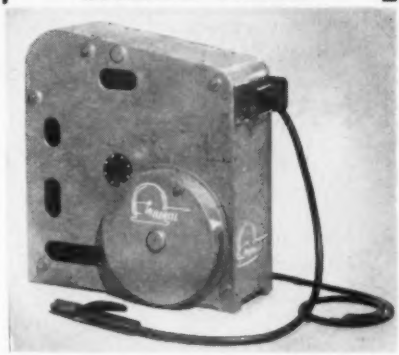
NEW WELDREEL ELECTRIC ARC CABLE REEL



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Airsan Welder Filters

Eliminate Dust to Maintain • Cooler Motors • Constant Arc • Longer Brush and Rotor Life • Greater Welder Efficiency • Constant Welder Operation • No Shut-downs • No blowing out of welders

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Five Hopeful Facts You Should Know About the Heart Diseases

Today, hearts are being saved because heart research is making vital, new discoveries – because people are beginning to know these 5 hopeful facts.

1 Some forms of heart disease can be prevented . . . a few can be cured.

2 All heart cases can be cared for best if diagnosed early.

3 Almost every heart condition can be helped by proper treatment.

4 Most heart patients can keep on working – very often at the same job.

5 Your "symptoms" may or may not mean heart disease. Don't guess – don't worry. See your doctor and be sure.

. . . fight fears with facts . . .

help your heart fund . . .
help your heart

Pencil-type pneumatic grinder removes flaws and furnishes clean, solid base for weld metal.

Tungsten inert arc welding prevents marring of polished aluminum surfaces. Welds are clean, smooth and flush.

Techniques for Inert Arc Welded Repair of Aluminum Sand Castings

by E. R. KELLOGG,
Welding Supervisor

ALWAYS a problem in aluminum sand castings, porosity was also a problem at American Floor Surfacing Machine Co., Toledo, Ohio. Blow holes were developing in cast components after they had undergone extensive and expensive machining, grinding and polishing operations. As a result, the company was faced with the task of salvaging cast components used in the floor sanding, polishing, and scrubbing machine it manufactures.

And this was no minor problem, either. Discarding defective castings was out of the question. For example, castings, which had to be repaired, had as much as forty or fifty dollars of material and labor cost invested in them before flaws were apparent.

The solution was a simple one. Because of its many advantages, manual inert arc welding was selected to do the repair job. First of all, the process gives localized heat input which prevents the marring of adjoining polished surfaces. Secondly, manual inert arc welding produces welds that are clean, smooth and almost flush. As a result, welded areas require no grinding, needing only polishing to

(Continued on page 126)

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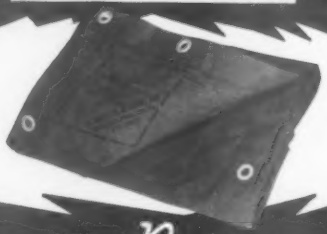
CONFINE YOUR DANGER!



USE Reeves FIRE CHIEF TREATED WELDING CURTAINS

- close woven canvas
- weighs 10 ounces per square yard before treatment
- impregnated with Hooper's Fire Chief treatment under their patent
- Underwriters Laboratory approved

The perfect protective curtain for all your dangerous work.

A. SMITH & SON, INC.
"IF IT'S MADE OF CANVAS, WE MAKE IT"
Green & Ridge Ave. Philadelphia 23, Pa.

blend them in with the rest of the casting. In fact, after welding and polishing, repaired areas are just about impossible to locate.

However, development of welding technique caused some head scratching. These were developed after some trial and error experimentation.

Here's how the castings are welded.

Need Clean, Smooth Surfaces

Flaws are first ground out with pencil-type air grinders. This is done to furnish a clean, solid base for weld metal. Areas to be welded are then wire brushed thoroughly to eliminate oxides and are further cleaned with carbon tetrachloride.

Welding is done using aluminum welding rod ⅛ and 3/16-inches in diameter, 1/16 and 5/32-inch diameter thoriated tungsten electrodes and argon shielding gas. Welding rods contain 5 percent silicon and match composition of castings.

Welding current ranges up to 135 amps and is furnished by an AC welding machine converted to inert arc welding by addition of a high frequency convertor unit.

Techniques For Welding

Base metal is first puddled with arc only. Filler metal is then in-

for a firm grip . . . demand Allied BULLDOG

Grip-Lug TRACTOR GROUSER RETREAD

- EXCLUSIVE DESIGN
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serted directly into the puddle to obtain complete alloying with base metal. Puddling also permits dirt and impurities to float to top where they are easily removed by subsequent polishing operations. Outside edges are welded first, weld metal being deposited in globules. This is done to make a good joint with base metal. Center area is then filled in and entire weld surface smoothed over with the arc. These castings are all "color buffed" and welded spots cannot be detected without optical equipment. Of course, the filler rod must match the casting in composition.

Di Masi Heads Advertising at Fansteel

Joseph V. Di Masi has been appointed advertising manager of Fansteel Metallurgical Corporation succeeding Allan L. Percy, who continues as director of public relations.

He has served the company as assistant advertising manager since 1945.

MEETS EVERY STANDARD ACROSS THE WORLD!

The leader for over forty years.
Quality in any quantity.

SHAWINIGAN
PRODUCTS CORPORATION
EMPIRE STATE BLDG. ● NEW YORK 1, N.Y.

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GLENN COMPANY
CONSTANT VOLTAGE
News Notes

Is Your Automatic Welding Power Source Outdated?

It is, if you're using variable arc voltage with variable wire feed—and getting variable results!

GLENN Constant Voltage Welders operate at fixed arc voltage, which means fixed wire feed rate for consistently top-quality welding. Results? Better welding, with fewer rejects, at far lower cost!

GLENN CV welders are jobproved for submerged arc, inert gas, CO-2, "squirt" and automatic hard facing and stud welding processes. 4 models—300, 500, 750 and 1200 amp. continuous duty rating, 18-42 v. arc voltage range. Write or wire for literature, application data, prices.

6

GLENN COMPANY
CONSTANT VOLTAGE PIONEERS
3134 E. 10TH STREET
OAKLAND 1, CALIF.
10228 SO. AVE. N.
CHICAGO 17, ILL.

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Torch brazing of aluminum furniture produces joints that are stronger and more ductile than mechanical ones. Rotating fixture permits operator to remain seated comfortably during entire brazing operation.

Aluminum Brazing Eliminates Need for Mechanical Joints

by **WALTER GRISKAVICH**

FORMERLY made with mechanical joints, aluminum parts are now being joined by brazing with better results which meet even the most rigid industry requirements.

At the Ohio Chemical and Surgical Equipment Company of Madison, Wisconsin, a division of Air Reduction, aluminum brazing is used extensively to join a variety of hospital furniture and equipment parts. It has been found that by brazing, joints with higher strength and ductility can be made with less effort and expense.

Cost saving at Ohio Chemical is accomplished primarily through streamlining of operations which brazing makes possible. Use of universal-type positioning fixtures and ability to make joints without removing parts from these fixtures play an important part in cost reduction.

Two different types of fixtures are used for brazing. One rotates

in such a way that the operator can remain seated in the same position throughout the entire brazing operation.

For brazing, operators use a slightly reducing oxy-acetylene flame and 10-percent silicon-aluminum alloy filler wire. Free flowing at 1050°F, this filler wire maintains low temperature and assures good penetration through the joint.

The liquid aluminum brazing flux used on both jobs is designed primarily for torch brazing of aluminum. It has a suitable melting point combined with an active chemical nature. Because of its excellent wetting characteristics, it produces maximum flow of the brazing alloy.

Flux is removed by immersion in a 50 percent (by weight) solution of sodium hydroxide at 180°F, a hot water rinse, subsequent immersion in a 50 percent solution of nitric acid at room temperature and finally a second hot water rinse. Joint areas are finished by buffing and no grinding is required.

Mr. Griskavich is technical sales rep for Air Reduction Sales Co.

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NOW... a new popular
DE-STA-CO
TOGGLE CLAMP
in steel OR ALUMINUM!
MODEL 441
Actually this photo shows two models—Model 441 (Steel) and Model 441-A (ALUMINUM)!—identical except 441 is of hardened alloy steel, BUT MODEL 441-A IS OF HEAT-TREATED ALLOY ALUMINUM!
What's the difference? Steel is stronger. ALUMINUM IS LIGHTER! Model 441 (Steel) weighs 10 oz; Model 441-A (ALUMINUM), only 3½ oz! 441 has holding pressure of 350 lbs.; 441-A, 200 lbs.! . . . Use steel for strength; ALUMINUM for lightness, to lessen worker fatigue, or for electronic welding, due to its non-magnetic qualities.
Write for Literature on Models 441, 441-A!
DE-STA-CO
DETROIT STAMPING COMPANY
WORLD'S FIRST LINE OF TOGGLE CLAMPS
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Industry's Fastest Selling
CYLINDER TRUCKS

LT-200

Many Styles For all Sizes of Cylinders

Write for full Information

KC-50

Welded Truck & Specialty Co.
1306 DIVERSEY PKWY • CHICAGO 14, ILLINOIS
SOLD ONLY THRU "INDEPENDENT DEALERS"

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NEWS

from page 44

Phillips New Editor of "Welding Handbook"

Arthur L. Phillips has been appointed editor of the A.W.S. "Welding Handbook," it was recently announced. Phillips has been associated with the metals field for many years. He has specialized in welding technology and has written numerous handbooks and manuals for the Eutectic Welding Alloys Corporation. He is the author of over 200 feature articles on welding and related subjects.

Cannon Named Sylvania's Field Sales Manager

Appointment of Joseph G. Cannon as field sales manager for the Tungsten and Chemical Division of Sylvania Electric Products Inc. has been announced by Robert Beatty, general sales manager of the division.

Previous to his appointment, Cannon was district sales supervisor for the Tungsten and Chemical Division. He joined the division in 1947 as a sales engineer.

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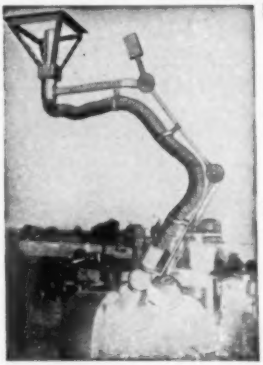
Weld-O-Vent

WELDING FUME EXHAUSTERS
MANY EXCLUSIVE FEATURES
by
ENGWALD CORP.
"The World's Finest Exhaust Systems"



High Velocity Hood Quickly Removes Smoke and Fumes.

- Portable and stationary units for all applications.
- Unlimited flexibility, fast, easy positioning, over 360° radius.
- Blowers can be attached to units or mounted at remote points connecting with ductwork.
- Units can be connected in series.

Available in 9, 12, or 16 feet reach units.

Write For New Application Data . . .

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Manufacturers
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S-M-S CORPORATION
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8 STEPS TO BETTER WELDING

ELECTRODE DRESSERS
EJECTOR TYPE HOLDERS
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WELDING WHEELS & ELECTRODES
ADJUST-A-COLD ELECTRODE HOLDERS
FORGINGS & CASTINGS IN SPECIAL ALLOYS

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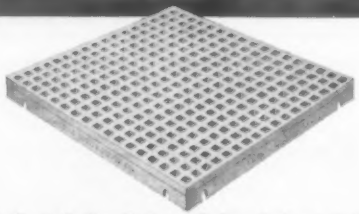
BENDING BLOCKS or WELDING PLATENS



4 ft. x 4 ft.—5 ft. x 5 ft.—5 ft. x 6 ft. Also other sizes. Cast steel blocks for layout, welding and assembly. Tools, stands and accessories. Write today for information.

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Delaware Ave. & Poplar St., Philadelphia 23, Pa.

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BRAZILIAN DEERSKIN
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Ask Your Dealer For
Tillman Products
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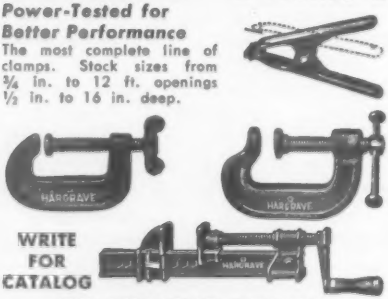
WELDERS' CLAMPS
Power-Tested for Better Performance
The most complete line of clamps. Stock sizes from ¾ in. to 12 ft. openings ½ in. to 16 in. deep.



WRITE FOR CATALOG

THE CINCINNATI TOOL CO.
1985 Waverly Ave. • Cincinnati 12, Ohio

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Elect Taylor President at Harris Calorific

Clarence M. Taylor, one-time executive vice president of Lincoln Electric Co., was elected president of Harris Calorific Co., Cleveland, Ohio, succeeding the late Lorn Campbell, Jr. Mr. Taylor's association with the gas welding equipment manufacturer has been that of a director, an association which he continues.

TAYLOR

MILLIGAN

Mr. Taylor was associated with Lincoln Electric Co. for 20 years starting in 1916. He rose to the position of Sales Vice President in 1928 and Executive Vice President in 1946. A member of the American Welding Society, Mr. Taylor is active as a director and trustee in numerous Cleveland businesses and institutions.

At the same time, John R. Milligan was appointed vice president. All administrative functions of the company will be under Mr. Milligan's direction. He has been with Harris for 20 years and was Secretary-Treasurer for many of them.

M & T Names Kel-Ray Sales Head

Charles M. Dick, Jr., has been named by Metal & Thermit Corp. to direct its nation-wide staff of sales engineers handling new Kel-Ray projectors for industrial radiography with gamma rays from radioactive isotopes.

Circle No. 83 on Reader Service Card.

Dick joins Metal & Thermit after a 19-year career as welding operator, welding supervisor and welding engineer. Prior to taking his new post he served as a welding engineer at Todd Shipyards, Houston, Texas.

Hobart Makes Appointments

Harold Scrutton was recently named district manager of the Southeast Area for Hobart Bros. Co., Troy, Ohio. Mr. Scrutton will

SCRUTTON

HEADAPOHL

have headquarters in Gastonia, N. C.

At the same time, announcement was made that John H. Headapohl had joined the company as sales engineer specializing in automatic welding.

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10-190 amp 110-220 v

That's the capsule story of 190-A—one of scores of precision welders—both arc and spot—from the forward looking engineering of BIRDSELL. More power per dollar of investment—more power per handy pound. Invest some time—call your dealer for a demonstration of welders, sensational in concept—unheard of in performance!

BIRDSELL PRODUCTS

PALO ALTO CALIF.

STEPLESS AMPERAGE CONTROL

"Red Head"

WELDING CLAMPS

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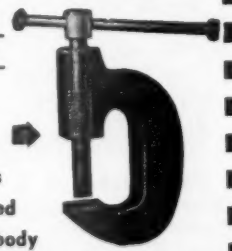
DESIGNED for WELDING



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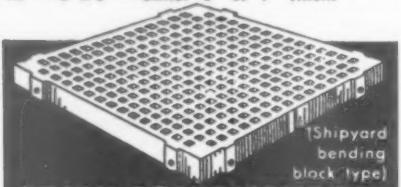

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Two New Members Join R.W.M.A.

Resistance Welder Manufacturers' Association has announced the affiliation of two new members: Peer, Incorporated, Benton Harbor, Mich., and Goodrich Welding Equipment Corp., Hudsonville, Mich. The two bring the Association's membership total to 18, a record high during the group's history.

LETTERS TO THE EDITOR . . .

(Continued from page 38)

it very worthwhile. Our welding section has indicated that they would like to receive a copy regularly.

We would like very much to be placed on your distribution list.

H. C. Filbert, V.P.
Miller Research Laboratories

Many such requests are processed every day. Our primary requirement is a company's welding activity and the recognized responsibility of our recipients.

Glass Tape for Weld Back-Up

Dear Mr. Gilbert:

We have recently received an inquiry from a good customer concerning a glass tape manufactured for use in backing up weld joints. I would appreciate your advising if you know some one who can furnish such a tape in 1-inch width.

This information will be sincerely appreciated.

J. B. Smith,
Pye-Barker Welding Supply Co.

This material is marketed by Minnesota Mining and Mfg. Co. Complete details have been forwarded.

Grinding Wheel Company Adds Electronic Process

Electronic computing equipment has been linked with a punch card system to calculate automatically the manufacturing formulas for all grinding wheels produced by the Bay State Abrasive Products Co. The company calls their new process "Electronic Formulation," and hails it an industry "first."

Wide Use of Grinding Wheels

Grinding wheels are used throughout industry in literally thousands of variations. This is because every grinding job is different. First, a grinding application is analyzed by an Abrasive Engineer who determines the grinding qualities needed. He then recommends a wheel specification that will furnish these qualities. The manufacturer, in turn, calculates *a formula* for every grinding wheel specification ordered. The formula tells the factory the proportion of ingredients that will be needed to make a wheel which will match the specification of the engineer.

Calculate Formula in Seconds

The new electronic formulation system at Bay State now calculates in seconds what a complete department could produce in a day and performs these calculations with a consistent accuracy beyond human capacity.

Bay State's new electronic computation equipment, using established constant data, now can precisely figure the grinding wheel formula to produce any specification in any size and quantity that may be ordered.

For more information about this interesting process, write Editor, Industry & Welding, 1240 Ontario St., Cleveland 13, Ohio, or Circle No. 200 on Reader Service Card.

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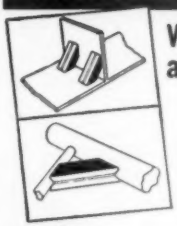
Aronson TWINNER
MAGNETIC CLAMPS



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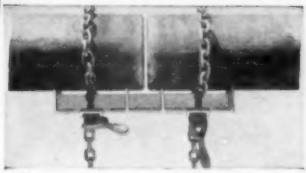

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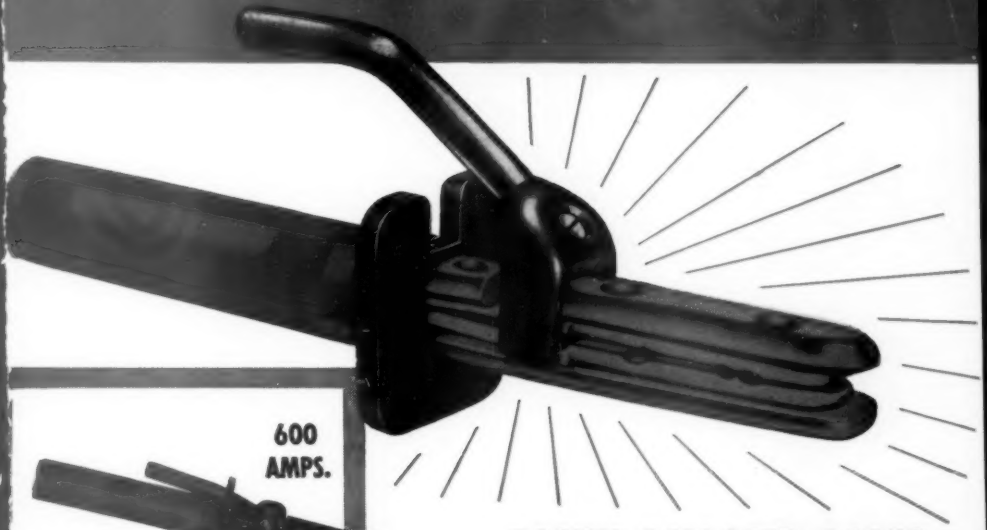

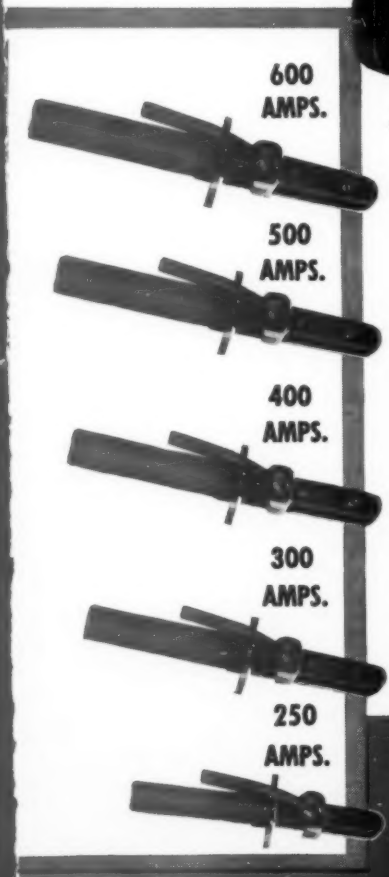

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